Standard Chlorine Chemical Company, ...

Stage I Analysis Report for:

Sampling and Analysis of Potentially Dioxin - Contaminated Materials in Waste Lagoons

Standard Chlorine Chemical Company
Kearny, New Jersey

Volume I
Summary of Stage I Efforts
Appendix A: Boring Logs

September 1987

WESTON
MANAGERS DESIGNERS/CONSULTANTS

N.J. 201 997-1700
TELEX: 138345
STANCHLOR KRNY

STANDARD CHLORINE CHEMICAL CO., INC.

1035 BELLEVILLE TURNPIKE · KEARNY, NEW JERSEY 07032-0602

September 16, 1987

Mr. Gerald Hartig
Site Manager-BSM
New Jersey Department of
Environmental Protection
CN 028
Trenton, NJ 08625

Dear Mr. Hartig:

Enclosed for your review is the Stage 1 report for the "Sampling and Analysis of Potentially Dioxin-Contaminated Materials in Waste Lagoons" at the Kearny, New Jersey facility of the Standard Chlorine Chemical Company (SCCC). This report was prepared for SCCC by Roy F. Weston, Inc. in accordance with the Work Plan for the site which had been approved by the New Jersey Department of Environmental Protection (NJDEP).

The referenced report consists of three volumes. Volume I contains an introductory text summarizing the project background and scope, and presenting a tabular summary of the analysis results along with recommendations for Stage II analysis. Also included in Volume I are site maps, cross-sections through the lagoons, and stratigraphic boring logs (Appendix A).

Volumes II and III contain Appendix B, the sample documentation packages as received from our contract laboratory, ENSECO, Inc. (California Analytical Laboratory). The Stage I results were received in five separate reports, which have been submitted as report numbers one through five. Report numbers one and two comprise Volume II, report numbers three, four, and five comprise Volume III, which also contains Appendix C which summarizes data collected in 1985.

Results of Stage I analysis indicate the presence of 2,3,7,8-TCDD above the action concentration of one part per billion (ppb) only for samples taken at locations, E, K, and R. As all four samples at location I have already been analyzed and reported, we propose, in accordance with the Work Plan, to instruct ENSECO to analyze Stage II (Batch III) samples only from locations E, K, and R.

Also location: G, F, C, B, A, J.

will be expected as per plan

Four samples submitted for analysis as part of Stage I, (numbers F-1, J-2-SS, J-3-SS, and J-4-SS) were extracted successfully by the laboratory but, as documented in report Numbers two and five (Appendix B), the liquid phases in each of the extracts crystallized, prohibiting analysis by the approved method. We would like to obtain acceptable results for these four samples, and hope that you can provide suggestions for an alternate method of analysis which would be acceptable to NJDEP.

A wipe sample collected inside the distillation building (WS-1) showed the presence of TCDD at 9.6 ppb. With your concurrence, we propose to collect three or four confirmatory samples within the building at locations agreed upon with NJDEP. We suggest that one of these samples take the form of a "residue composite", collected by sweeping or vacuuming particulate matter from the building interior into a container, homogenizing the material, and submitting a representative fraction for analysis. Other samples could be collected in the same manner as was WS-1 and we suggest that another wipe sample be taken in the immediate adjacent area of WS-1. All of these additional wipe samples could be included in the upcoming analytical batch with no increase in required QA, since the batch is very small.

We intend to authorize Enseco to proceed with the next batch of analyses by 9 October, and would appreciate receiving NJDEP comments by that date. We will be in touch with you prior to that date to arrange mutually agreeable wipe sample locations. Should you have any questions, please feel free to contact me at any time.

Sincerely,

Nic. A. Stufano

Nicholas A. Stufano
Manager Special Projects

NAS:kp
Enc.

Stage I Analysis Report For:

Sampling and Analysis of Potentially Dioxin-Contaminated Materials in Waste Lagoons at the Standard Chlorine Chemical Company Facility Kearny, New Jersey

Prepared For:

Standard Chlorine Chemical Company, Inc.
1035 Belleville Turnpike
Kearny, New Jersey 07032

September 1987

Prepared By:

Roy F. Weston, Inc.
Weston Way
West Chester, Pennsylvania 19380

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WESTON

SECTION 1

INTRODUCTION

1.1 BACKGROUND

Samples have been collected at the Standard Chlorine Chemical Company (SCCC) facility in Kearny, New Jersey, on two occasions under the New Jersey Department of Environmental Protection (NJDEP) Dioxin Program. These samples were collected first by E.C. Jordan under contract to NJDEP, and second by Roy F. Weston, Inc. (WESTON) under contract to SCCC. A summary of locations and results of sampling of surficial and deep samples collected during this 1985 investigation has been included as Appendix C (Volume III). All samples have been analyzed by NJDEP certified laboratories using Regular Analytical Services (RAS) (low-resolution GC/MS). Results have indicated that levels of dioxin (2,3,7,8-TCDD) ranging from 3 to 62 ppb were present at three locations at the facility:

- Distillation Pot
- Northeast corner of West Lagoon
- Northwest corner of East Lagoon

NJDEP has indicated their decision to classify portions of the SCCC facility as a dioxin site, and has requested that SCCC proceed with additional sampling and analysis to determine the magnitude and extent of the cleanup effort needed.

1.2 SCOPE OF WORK

The scope of work undertaken has been subdivided into a sequence of tasks, as follows:

Task I - Sampling of materials within the lagoons at points distributed over a grid encompassing both lagoons. Additionally, collection of two surface soil samples (0-0.5 ft.) outside the lagoons and two wipe samples (within the distillation building) at locations selected by NJDEP personnel.

Task II- Laboratory analyses of samples collected during Task I.

Task III - Data evaluation

Task IV - Meeting

Each of these tasks are discussed in greater detail in the following paragraphs.

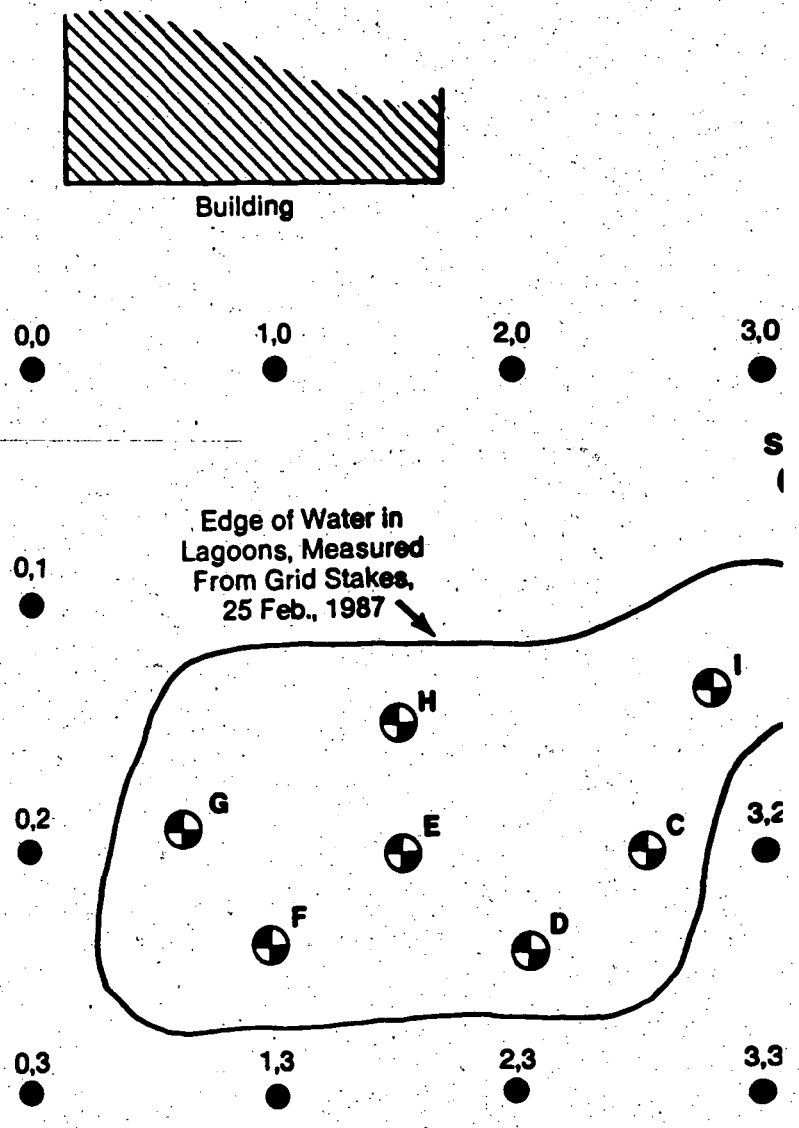
1.2.1 Task I - Sampling

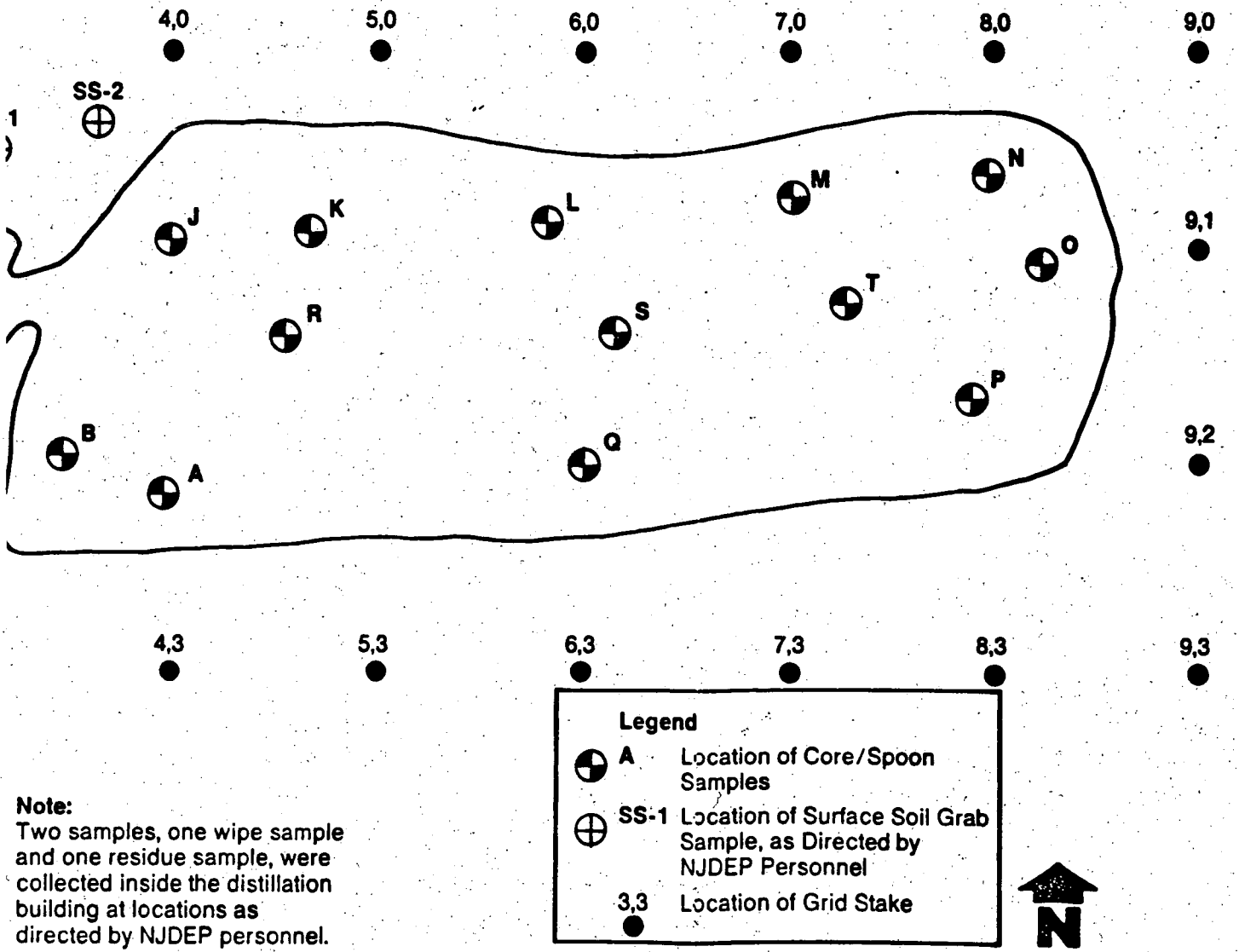
1.2.1.1 Sample Collection

Sampling of lagoon materials (and collection of other samples) was executed during 25 February - 18 March, 1987. Sample locations, keyed to a 50 ft. - interval grid, are shown on Figure 1-1. Included were 7 locations within the west lagoon and 13 locations within the east lagoon, as agreed upon with NJDEP personnel. Three stratigraphic cross-sections through the lagoons (and including lagoon perimeter borings executed in 1985), along with a location map for the cross-sections, are included as Figures 1-2, 1-3, 1-4, and 1-5. Boring logs are included as Appendix A.

During 25-27 February 1987, sampling was attempted using a vibracore system. The vibracore, designed to penetrate soft, predominantly fine-grained materials, as were expected to constitute the lagoon materials, would permit collection of a continuous core through the entire thickness of the emplaced waste materials. The vibracore proved unsuccessful, because repeated attempts to penetrate the wastes revealed the existence of consolidated or semi-consolidated materials and coarse debris which caused refusal of the vibracore tubes in the upper 3-5 feet of waste materials. During that period we discussed potential alterations to the field program to accommodate this shallower penetration, but it was decided to proceed with alternate sampling methods to obtain samples from the depth intervals as approved by NJDEP in the Work Plan.

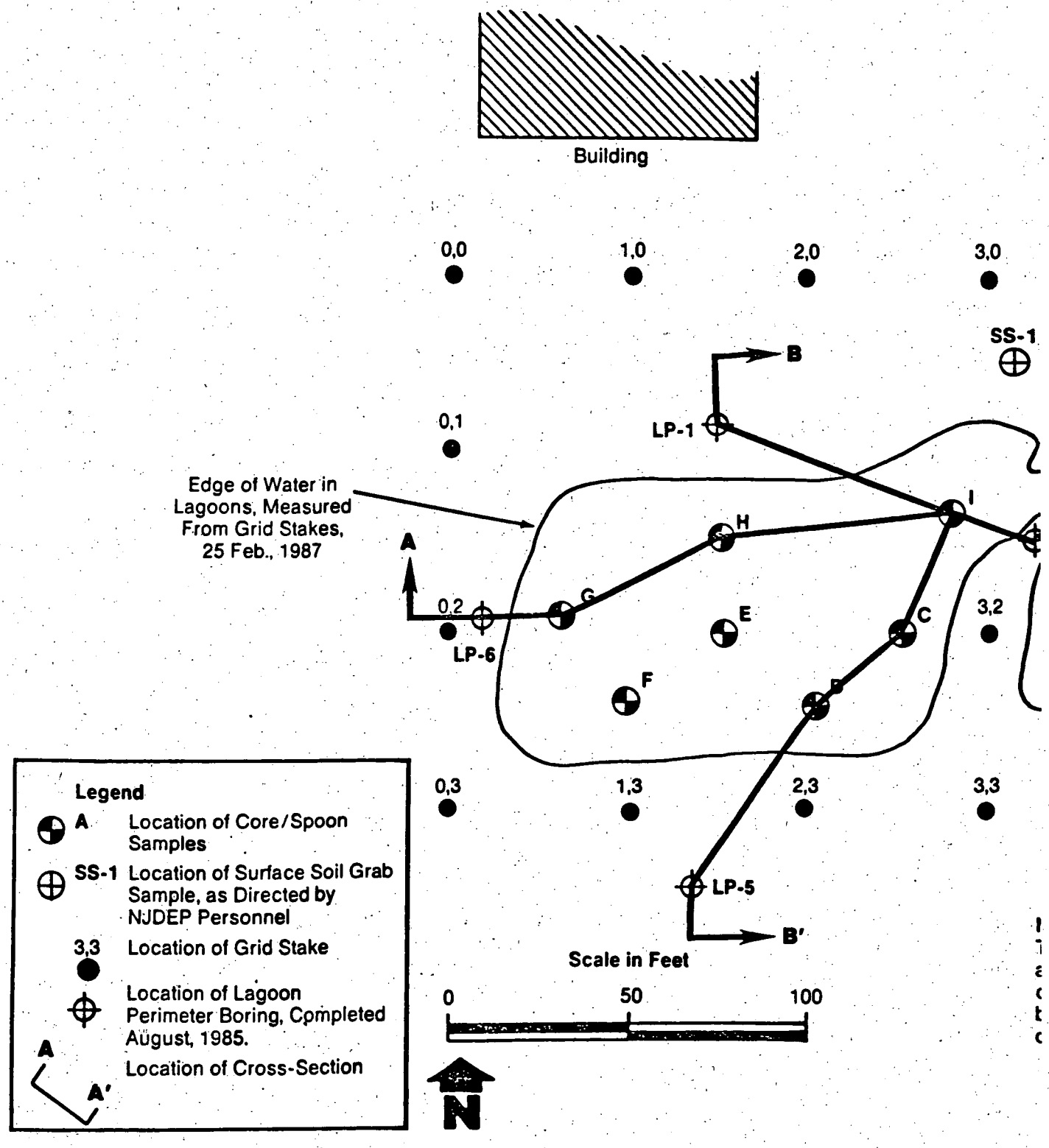
Beginning on 4 March 1987, sampling was initiated with a new technique. The new technique was a modification of the wash-bore technique approved by NJDEP, a modification expected to be necessary since it was anticipated that the approved water-jetting system would not be able to remove the large chunks of crystalline material encountered by the vibracore. This technique involved utilizing two 5-foot long, 3-inch diameter split-spoon samplers which were driven into the wastes with a standard 140 lb. hammer. The hammer was lifted by a portable tripod and gasoline powered cathead system, essentially a modified Standard Penetration Test. At each location, the first spoon was driven to its full depth, was removed from the hole, and a second spoon was immediately placed in the borehole, and driven to an approximate elevation corresponding to the depth of the native "meadow mat" materials, then removed. This method

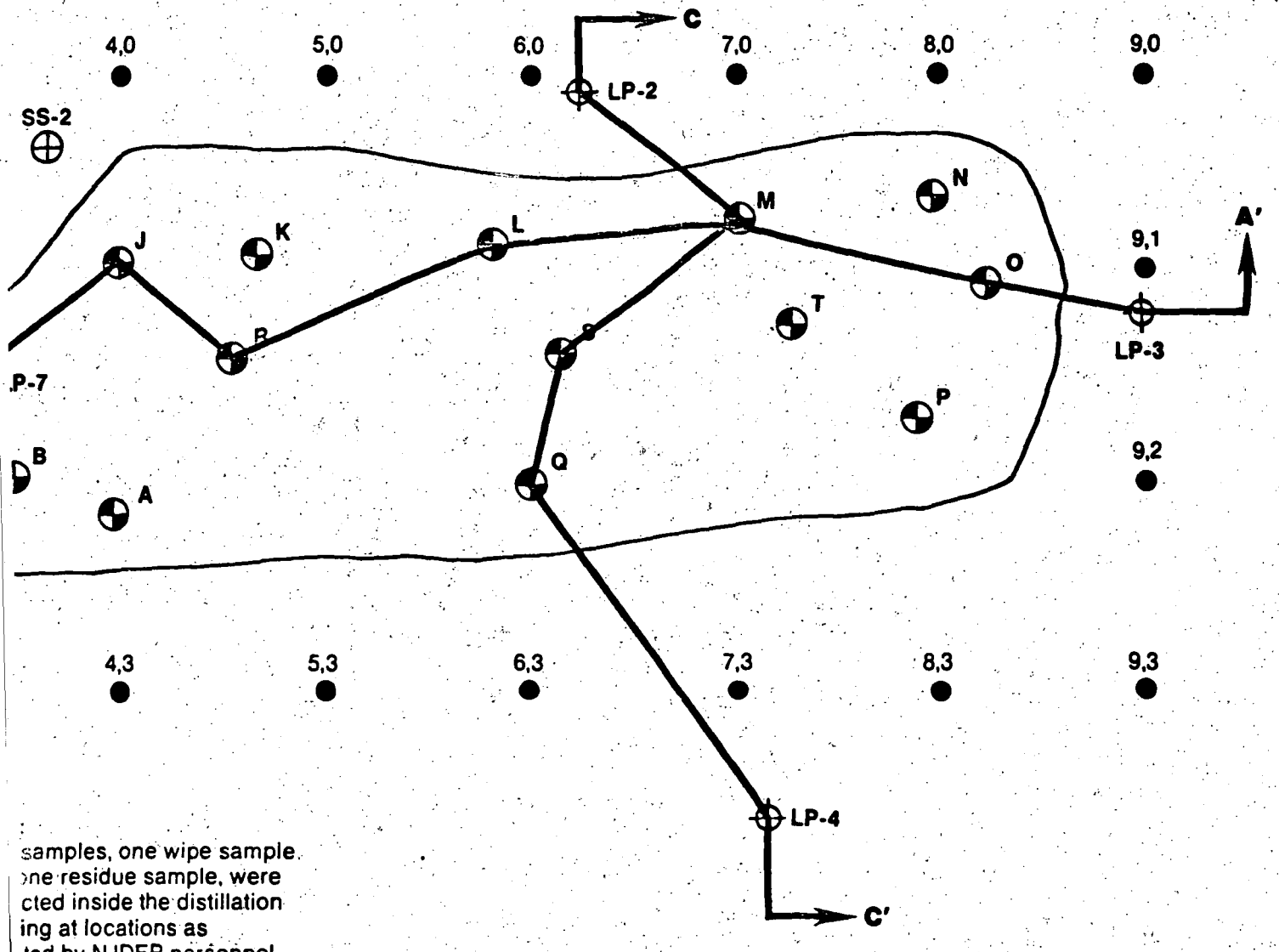

Building
0,0
1,0
2,0
3,0
Edge of Water in Lagoons, Measured From Grid Stakes, 25 Feb., 1987
0,1
0,2
0,3
1,3
2,3
3,3
3,2
H
I
G
E
C
F
D
Scale in Feet
0
50
100



Note:
Two samples, one wipe sample and one residue sample, were collected inside the distillation building at locations as directed by NJDEP personnel.

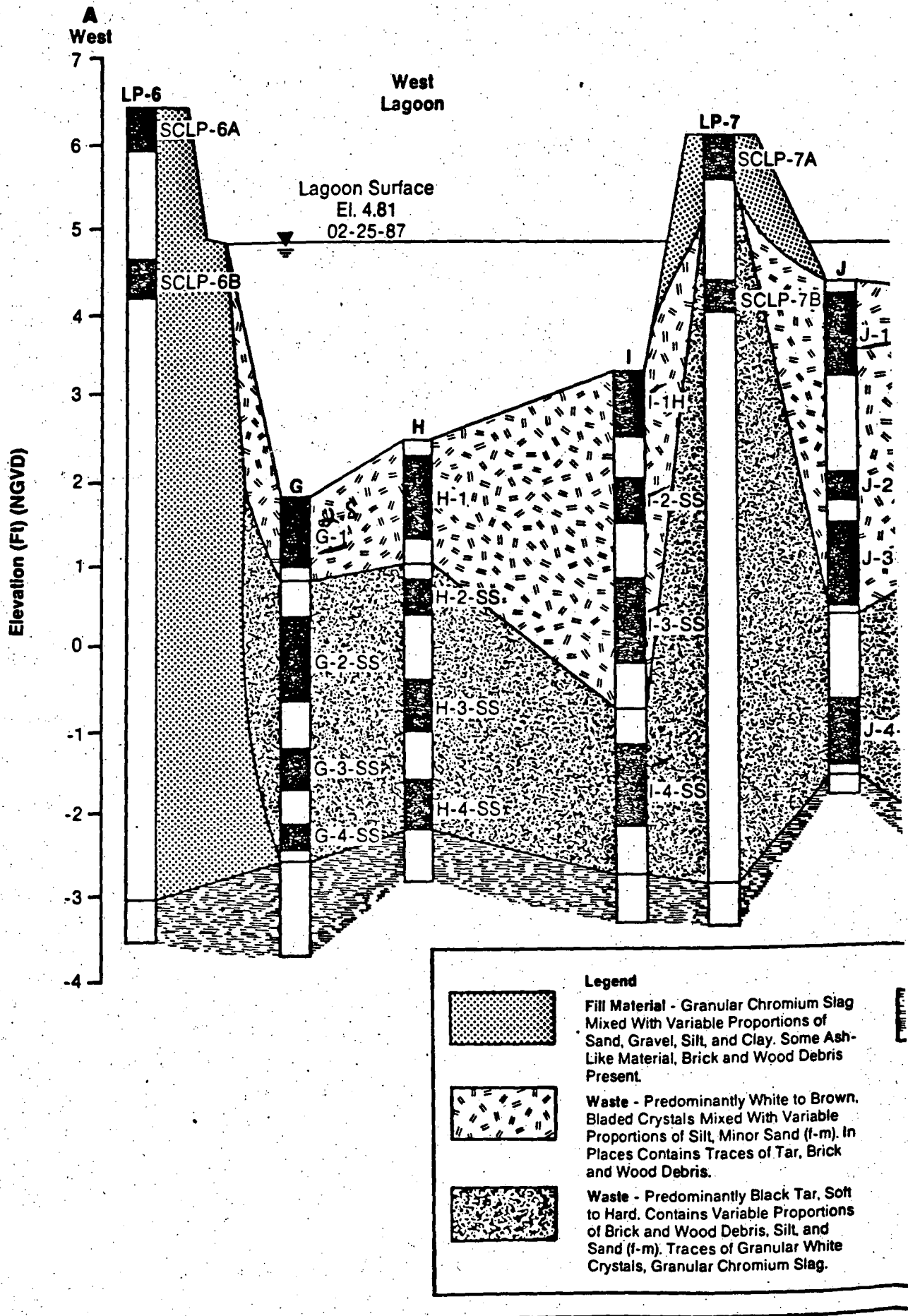
FIGURE 1-1 SAMPLE LOCATIONS, DIOXIN SAMPLING STANDARD CHLORINE CHEMICAL COMPANY, KEARNY, NEW JERSEY


Building
0,0
1,0
2,0
3,0
SS-1
B
0,1
LP-1
Edge of Water in Lagoons, Measured From Grid Stakes, 25 Feb., 1987
I
H
A
0,2
G
E
C
3,2
LP-6
F
D
0,3
1,3
2,3
3,3
LP-5
B'
Scale in Feet
0
50
100
N
Legend
A
Location of Core/Spoon Samples
SS-1
Location of Surface Soil Grab Sample, as Directed by NJDEP Personnel
3,3
Location of Grid Stake
Location of Lagoon Perimeter Boring, Completed August, 1985.
A
A'
Location of Cross-Section



samples, one wipe sample.
one residue sample, were
cted inside the distillation
ing at locations as
ted by NJDEP personnel.

FIGURE 1-2 LOCATIONS OF STRATIGRAPHIC CROSS-SECTIONS THROUGH LAGOONS - STANDARD CHLORINE CHEMICAL COMPANY, KEARNY, NEW JERSEY


A
West
7
6
5
4
3
2
1
0
-1
-2
-3
-4
Elevation (Ft) (NGVD)
LP-6
SCLP-6A
SCLP-6B
West
Lagoon
Lagoon Surface
El. 4.81
02-25-87
LP-7
SCLP-7A
SCLP-7B
G
G-1
G-2-SS
G-3-SS
G-4-SS
H
H-1
H-2-SS
H-3-SS
H-4-SS
I
I-1H
I-2-SS
I-3-SS
I-4-SS
J
J-1
J-2
J-3
J-4
Legend
Fill Material - Granular Chromium Slag Mixed With Variable Proportions of Sand, Gravel, Silt, and Clay. Some Ash-Like Material, Brick and Wood Debris Present.
Waste - Predominantly White to Brown, Bladed Crystals Mixed With Variable Proportions of Silt, Minor Sand (f-m). In Places Contains Traces of Tar, Brick and Wood Debris.
Waste - Predominantly Black Tar, Soft to Hard. Contains Variable Proportions of Brick and Wood Debris, Silt, and Sand (f-m). Traces of Granular White Crystals, Granular Chromium Slag.

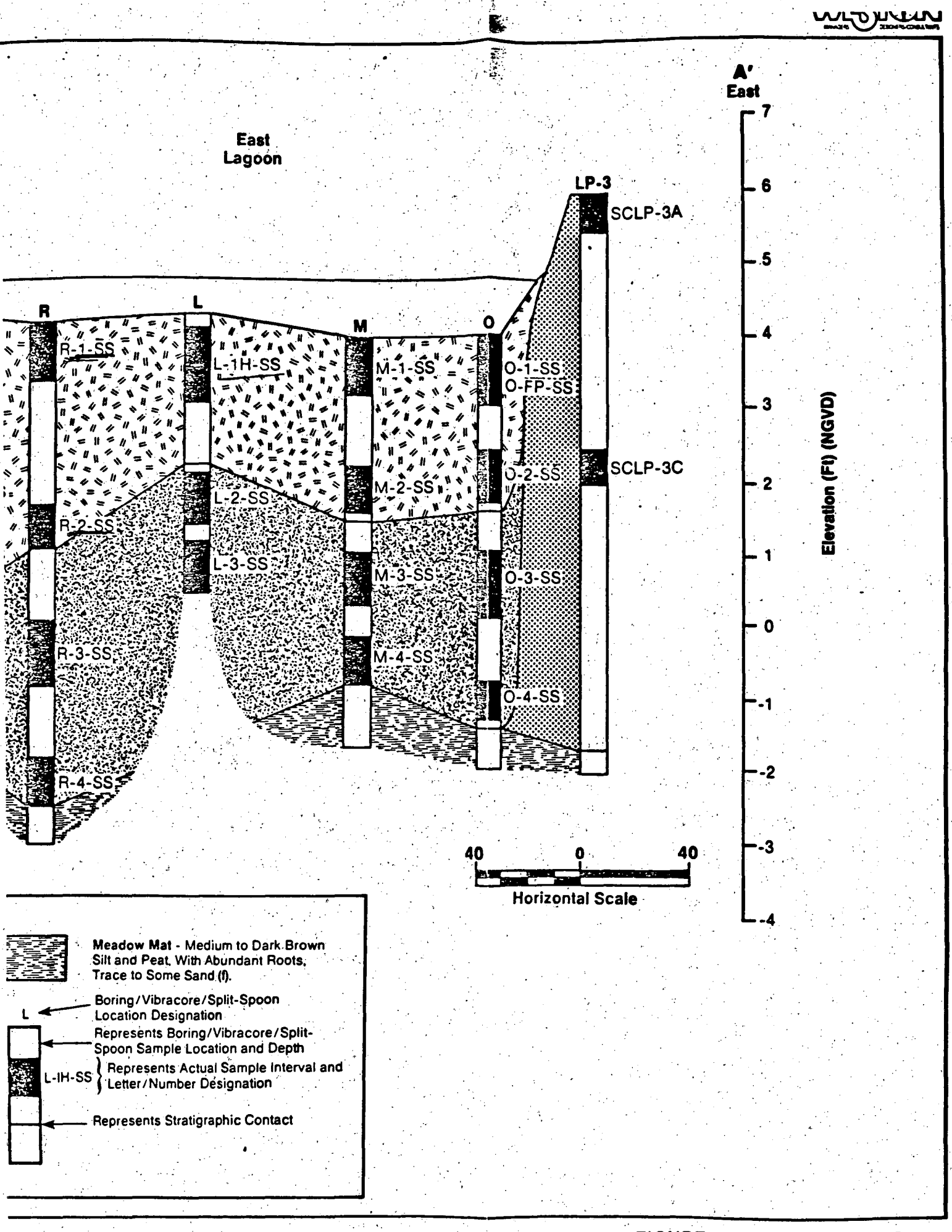
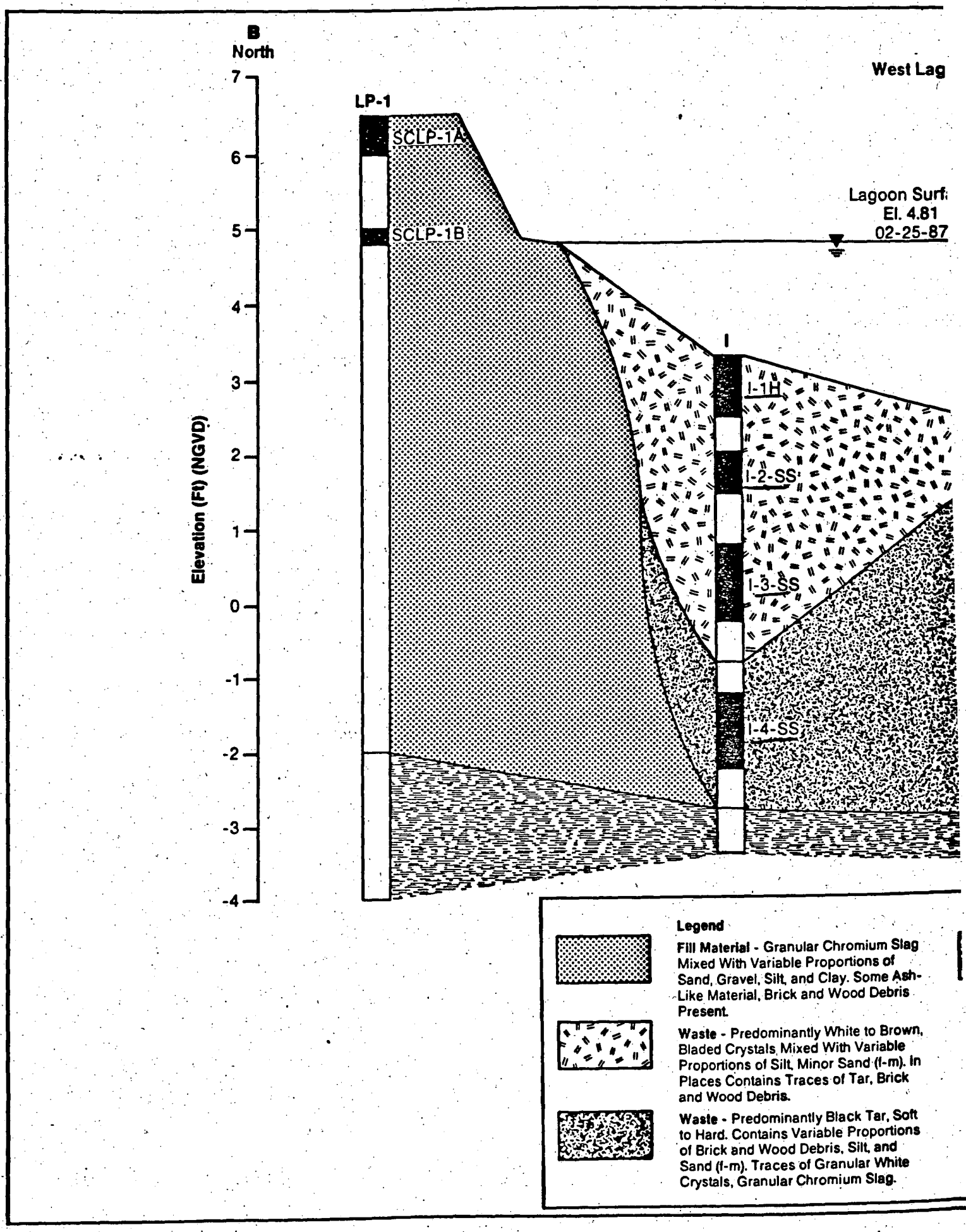


FIGURE 1-3 STRATIGRAPHIC CROSS-SECTION A-A'


B
North
West Lag
LP-1
SCLP-1A
SCLP-1B
Lagoon Surf
El. 4.81
02-25-87
I
I-1H
I-2-SS
I-3-SS
I-4-SS
Elevation (Ft) (NGVD)
7
6
5
4
3
2
1
0
-1
-2
-3
-4
Legend
Fill Material - Granular Chromium Slag Mixed With Variable Proportions of Sand, Gravel, Silt, and Clay. Some Ash-Like Material, Brick and Wood Debris Present.
Waste - Predominantly White to Brown, Bladed Crystals Mixed With Variable Proportions of Silt, Minor Sand (f-m). In Places Contains Traces of Tar, Brick and Wood Debris.
Waste - Predominantly Black Tar, Soft to Hard. Contains Variable Proportions of Brick and Wood Debris, Silt, and Sand (f-m). Traces of Granular White Crystals, Granular Chromium Slag.

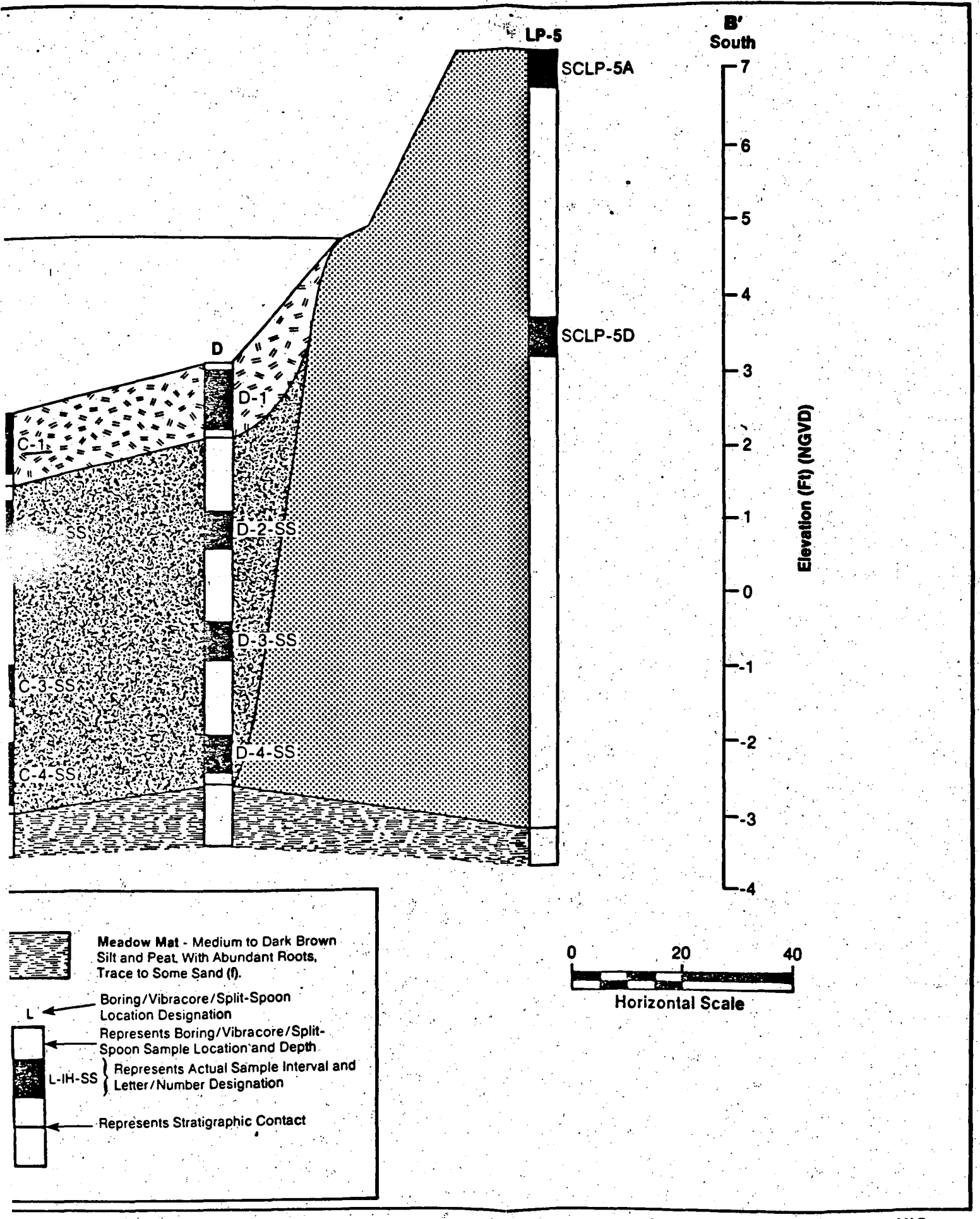
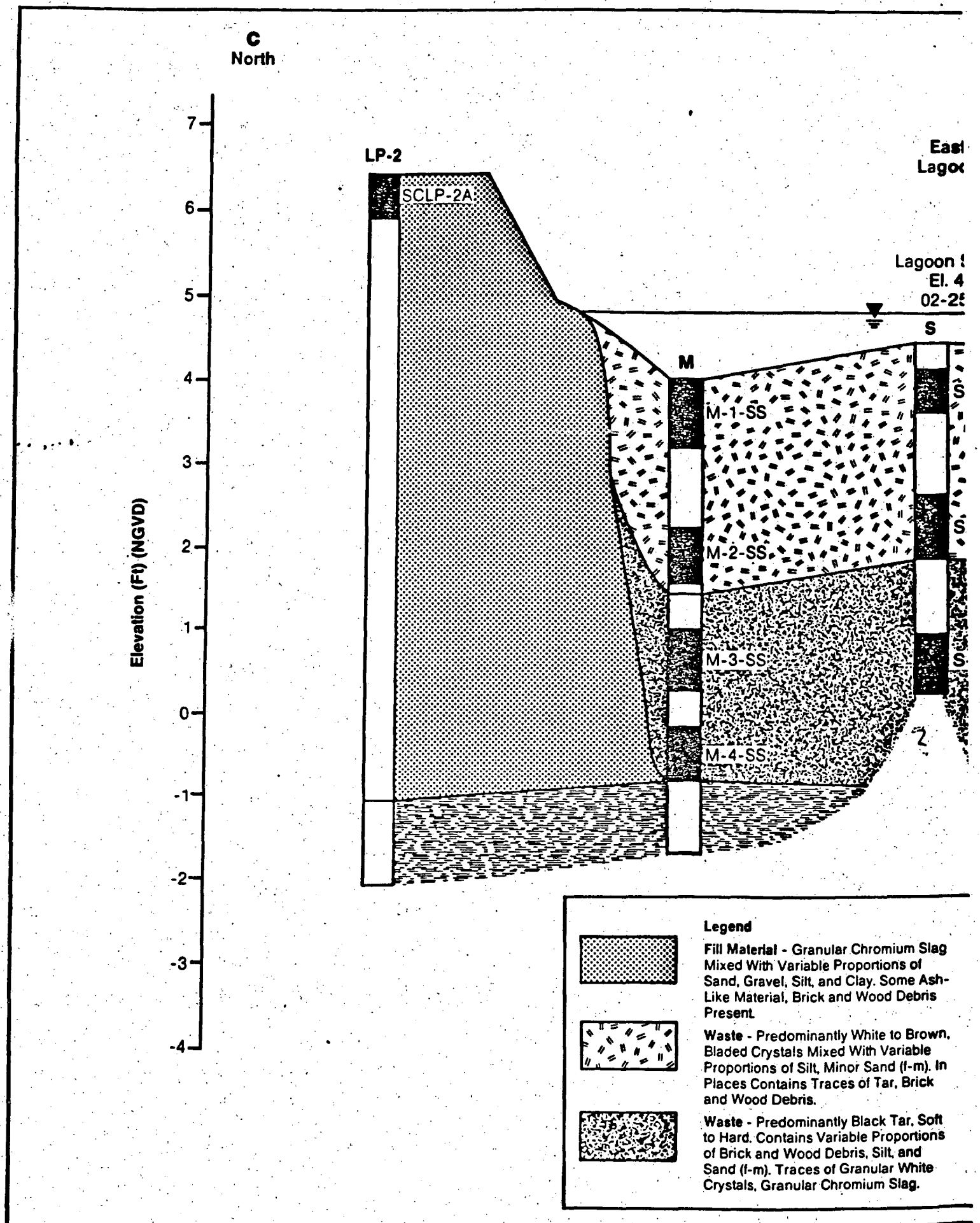


FIGURE 1-4 STRATIGRAPHIC CROSS-SECTION B-B'


C
North
LP-2
SCLP-2A
East
Lago
Lagoon
El. 4
02-2
S
M
M-1-SS
M-2-SS
M-3-SS
M-4-SS
Elevation (Ft) (NGVD)
7
6
5
4
3
2
1
0
-1
-2
-3
-4
Legend
Fill Material - Granular Chromium Slag Mixed With Variable Proportions of Sand, Gravel, Silt, and Clay. Some Ash-Like Material, Brick and Wood Debris Present.
Waste - Predominantly White to Brown, Bladed Crystals Mixed With Variable Proportions of Silt, Minor Sand (f-m). In Places Contains Traces of Tar, Brick and Wood Debris.
Waste - Predominantly Black Tar, Soft to Hard. Contains Variable Proportions of Brick and Wood Debris, Silt, and Sand (f-m). Traces of Granular White Crystals, Granular Chromium Slag.

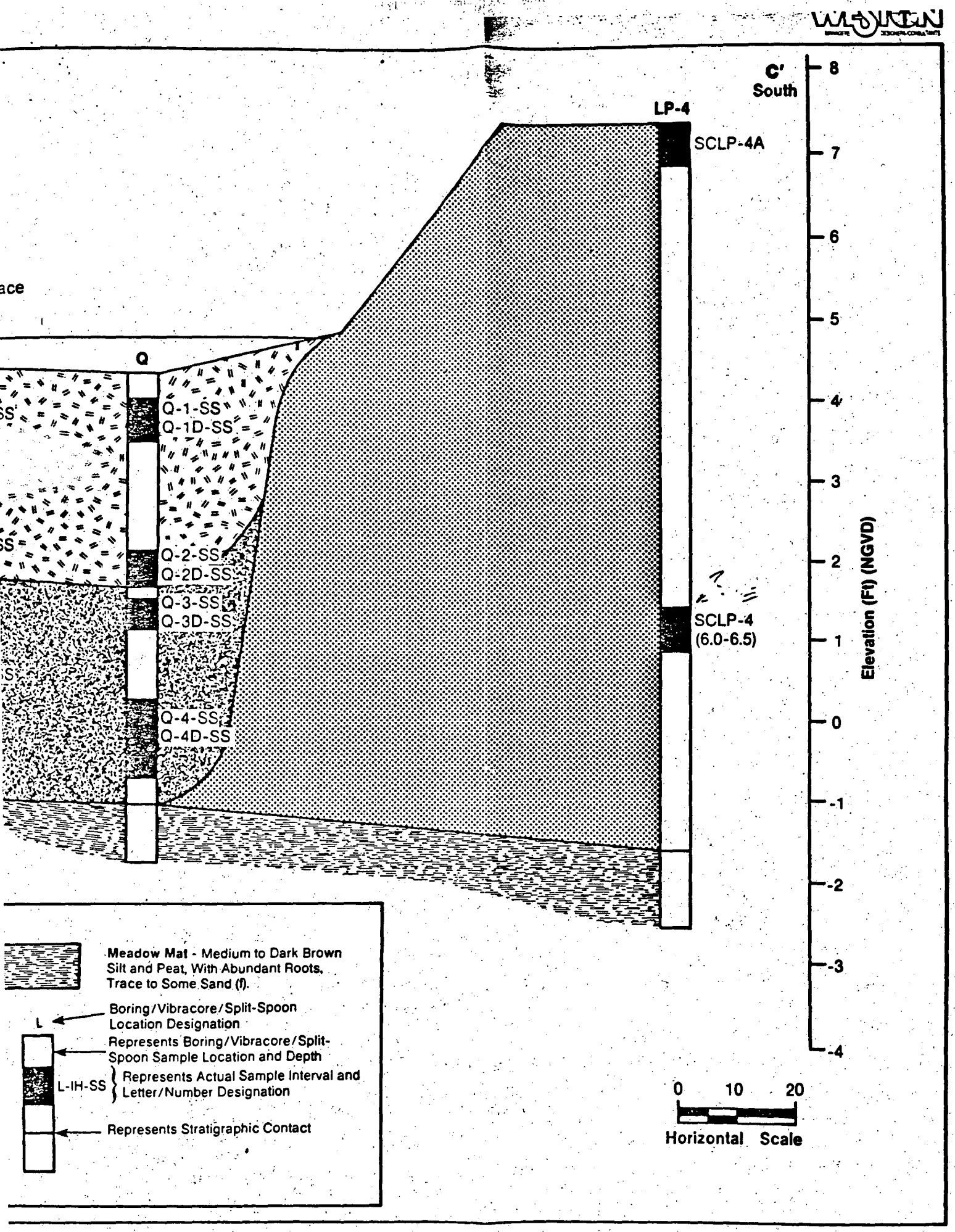


FIGURE 1-5 STRATIGRAPHIC CROSS-SECTION C-C'

proved effective in penetrating the full thickness of the waste materials in all but three locations (all in the east lagoon). At these locations, very hard materials encountered at a depth of approximately 3-5 feet caused refusal of the spoon (at least thirty minutes of hammer blows were performed in each case, with no advancement). During the time period of 4 March to 13 March 1987, following telephone conversations between NJDEP personnel and WESTON, it was agreed that the alternate technique of sampling would be acceptable and that samples collected by the alternate technique would be acceptable to the Department.

1.2.1.2 Environmental Samples

The sampling plan for the project called for a total of 80 core samples to be collected, along with two surface soil samples and two wipe samples.

A total of 74 core samples was obtained from the lagoons. Of the missing six samples, four were the result of bit refusal (as noted above). Two other samples could not be obtained from the central portion of a core taken from the west lagoon due to repeated non-recovery in the split-spoons (core "F"). It is believed that a very soft layer of tar-like material is present in the "F" area, and that relatively hard materials already in the spoon simply pushed the tar-like waste out of the way as the spoon was driven into the waste. Four attempts were made in an approximately 10-foot by four-foot area, all with the same result.

The two surface soil samples (SS-1 and SS-2) were collected at locations identified in the field by NJDEP personnel. Inside the distillation pot building, a wipe sample and a residue sample (RS-1) were collected, also at locations selected by NJDEP personnel.

1.2.1.3 Performance Samples

The sampling plan for the project called for a total of eight performance samples to be provided by the NJDEP. In addition, four field duplicates were called for, along with a blank wipe sample.

Five performance samples were provided by the NJDEP, and in accordance with instructions from NJDEP, the sample lots have been prepared with this reduced number of performance samples. In addition, the WESTON field team was instructed to obtain a shallow grab sample from the southeast corner of the east lagoon to be utilized as a field blank performance sample for Stage 1 Batch 1 lab analysis. The sample, according to NJDEP direction, was to be sent to the lab with

instruction that the suspected 2,3,7,8-TCDD concentration was zero, and that the lab should spike the sample at 1 ppb and analyze. The four field duplicates were collected, as was the blank wipe sample (WS-2) (hexane).

Under direction from NJDEP personnel, WESTON also instructed the analytical laboratory to utilize a sample from the initial batch of analyses (Batch 1) which did not show the presence of 2,3,7,8-TCDD, as a blank performance sample in each of the three subsequent batches (see below). Each sample was to be spiked in the laboratory, and analyzed with each of the three remaining batches.

1.2.2 Task II - Laboratory Analyses

All laboratory analyses are being performed by Enseco, Inc. (California Analytical Laboratory), an NJDEP approved contract lab, under direct contract with SCCC. The analytical method being used is the USEPA approved protocol for 2,3,7,8-TCDD ("Determination of 2,3,7,8-TCDD in Soil and Sediment", USEPA Region VII, 09/83), in compliance with all RAS requirements (as contained in EPA-CLP-IFB No. WA84-A002). Laboratory reports are submitted to SCCC in a Standard Contract Laboratory Program (CLP) format.

Analysis of samples is being undertaken in three stages. Except for the eight samples collected from locations "I" and "J" (see Figure 1-1), from which all four samples at each location were submitted, the first stage of analyses included only the two uppermost samples from each boring. Also included were the two surface soil samples (SS-1 and SS-2) and the two wipe samples (WS-1, RS-1), including a blank (WS-2). The remaining samples, the third sample down from all remaining borings representing Stage II and the fourth sample down representing Stage III, are being held in the custody of Enseco. As stated in the Work Plan, Stage II samples would be analyzed only where the immediately overlying samples show concentration of 2,3,7,8-TCDD above the 1 ppb action concentration. Similarly, fourth level samples (Stage III) will be analyzed only where Stage II results exceed 1 ppb for 2,3,7,8-TCDD. This report is a summary of analytical results from Stage I samples. Task III, data analysis, and Task IV, project meeting, will be completed following receipt of Stage II and Stage III analyses.

evaluation

SECTION 2

RESULTS OF STAGE I

Results of TCDD analysis for Stage I samples are summarized in Table 2-1. Included are WESTON sample identification numbers, Enseco identification numbers, TCDD concentrations measured in parts per billion (ppb), and TCDD detection limits for each sample in ppb. Also included on the table are "Report Numbers" for each sample. These numbers refer to individual laboratory report packages, as received from Enseco, which contain sample analysis documentation. These reports are included as Appendix B in Volume II and Volume III. Detection limits were not reported in samples which contained measurable TCDD.

2.1 PERFORMANCE SAMPLES

Stage I performance samples included: 4 method blanks; 5 duplicate analyses, one labelled Q-1D-SS, and 3 labeled with sample number and the subscript DUP; 3 native spikes, labeled with sample numbers and the subscript NS; one wipe sample blank, labeled WS-2; and three samples provided by NJDEP, labeled STDCL-1A, STDCL-1B, and STDCL-2B. Results of analyses of the performance samples are summarized in Table 2-1, documentation of analysis is presented in Appendix B.

2.2 ENVIRONMENTAL SAMPLES

Stage I analyses included 49 environmental samples. Locations of the lagoon samples and surface soil samples are shown in Figure 1-1. Sample depth intervals are included on the boring logs presented in Appendix A. At all 20 sample locations within the lagoons, shallow depth (Batch 1) environmental samples were collected. All of these sample results are reported with the exception of location "F" (sample F-1). Sample F-1 had very low internal standard recovery. This was considered to be a matrix problem. Recovery was attempted using a very small sample size (1.0g); even then a crystalline precipitate formed prior to final concentration.

Results of Batch 1 analyses showed the presence of TCDD above the 1 ppb action concentration at locations A, B, C, G, J, K, and R.

TABLE 2-1

STAGE I ANALYSIS SUMMARY

WESTON Sampler Number	Enseco Cal. Lab I.D Number	TCDD Measured PPB	TCDD Detection Limit (PPB)	Report No.
Method Blank	28940-MB	ND	0.13	1
Method Blank	28940-2MBRI	ND	0.092	1
S-1-SS	28940-2R	ND	0.41	1
R-1-SS	28940-5	15.3	--	1
N-1-SS	28940-15	ND	0.62	1
N-1-SS Dup	28940-15D	ND	0.49	1
L-1H-SS	28940-17RI	0.71	--	1
E-1	28940-24	0.85	--	1
I-1H	28940-28	ND	1.1	1
P-1-SS	28940-32RI2	ND	0.60	1
O-1-SS	28940-33	ND	0.33	1
O-FP-SS	28940-36	ND	0.53	1
O-FP-SS-NS	28940-36NS	9.2	--	1
B-1	28940-39	8.2	--	1
J-1H	28940-41	11.2	--	1
STDCL-1A	28940-51	ND	0.25	1
STDCL-1B	28940-52	9.2	--	1
C-2H-SS	28940-60	0.23	--	1
C-2H-SS-Dup	28940-60D	ND	0.45	1
M-1-SS	28940-61	ND	0.36	1
K-1H-SS	28940-69	69.6	--	1

TABLE 2-1 (Continued)

STAGE I ANALYSIS SUMMARY

WESTON Sampler Number	Enseco Cal. Lab I.D Number	TCDD Measured PPB	TCDD Detection Limit (PPB)	Report No.
Q-1-SS	28940-74RI	ND	0.56	1
Q-1-SS-NS	28940-74NS	8.2	--	1
Q-1D-SS	28940-80	ND	0.26	1
Method Blank	28940-MB	ND	0.12	2
Method Blank	28940-18	ND	0.20	2
SS-1	28940-18	ND	1.1	2
SS-2	28940-19	ND	1.4	2
F-1	28940-20	*	*	2
G-1	28940-21	2.8	--	2
H-1	28940-22	ND	0.73	2
D-1	28940-23	ND	0.90	2
T-1-SS	28940-37	ND	0.23	2
A-1	28940-38	2.6	--	2
Method Blank	28940-MBRI	ND	0.034	3
T-2-SS	28940-1	ND	0.21	3
S-2-SS	28940-3	ND	0.076	3
R-2-SS	28940-6	62.1	--	3
E-2-SS	28940-9	31.9	--	3
N-2-SS	28940-13	ND	0.82	3
L-2-SS	28940-14	ND	0.18	3
O-2-SS	28940-31	ND	0.028	3

Second level (Batch 2) environmental samples were collected at 19 locations within the lagoons. A sample was not obtained at location F-2 due to non-recovery after four attempts, as discussed in paragraph 1.2.1.2 above. Environmental samples also requested for analysis in Stage I included: SS-1 and SS-2, two surface soil samples (0-0.5 ft.) collected at locations specified by NJDEP personnel (see Figure 1-1); WS-1, a wipe sample and RS-1, a residue sample, both collected inside the distillation building at locations specified by NJDEP personnel; and, from the lagoons, F-4-SS, I-3-SS, I-4-SS, J-3-SS, and J-4-SS.

Results of Batch 2 analyses showed the presence of TCDD above the 1 ppb action concentration at locations E, I, K, and R within the lagoons. Neither of the surface soil samples showed the presence of TCDD above detection limits. The wipe sample, WS-1, collected from the concrete base of the distillation pot, showed 9.6 ppb of TCDD. Sample F-4-SS showed the presence of TCDD at 4.3 ppb.

2.3 Stage II Recommendation

In accordance with the procedure outlined in the Work Plan, Stage II samples at locations E, K, and R are recommended for analysis.

Based upon the results of the wipe sample (WS-1) collected within the distillation building, it is also recommended that three or four confirmatory samples be collected inside the building. One of these samples should take the form of a "residue composite", collected by sweeping or vacuuming particulate matter into a container, homogenizing the material, and submitting a representative fraction for analysis. Other samples should be collected in the same manner as was WS-1, at locations agreed upon by the NJDEP. One of these locations should be directly adjacent to the location from which WS-1 was collected.

Finally, we recommend that the best available technology be approved by NJDEP for analysis, either by Enseco or by Wright State University (Brehm Laboratories), of samples F-1, J-2-SS, J-3-SS, and J-4-SS. These 4 samples were not reported in Stage I due to matrix difficulties using the presently approved analytical methodology.

TABLE 2-1 (Continued)

STAGE I ANALYSIS SUMMARY

WESTON Sampler Number	Enseco Cal. Lab I.D Number	TCDD Measured PPB	TCDD Detection Limit (PPB)	Report No.
P-2-SS	28940-34	ND	0.11	3
C-1	28940-40	19.5	--	3
C-1-Dup	28940-40-Dup	16.3	--	3
I-2-SS	28940-42	3.2	--	3
I-3-SS	28940-43	38.4	--	3
I-4-SS	28940-44RI	6.2	--	3
D-2-SS	28940-47	ND	0.053	3
G-2-SS	28940-50	ND	0.12	3
B-2-SS	28940-55	ND	0.11	3
M-2-SS	28940-63	ND	0.084	3
K-2-SS	28940-66	2.7	--	3
H-2-SS	28940-70RI	ND	0.13	3
A-2-SS	28940-72RI	ND	1.5	3
Q-2D-SS	28940-79	ND	0.089	3
STDCL-2B	28940-87	3.5	--	3
Method Blank	28940-28MB	ND	0.087	4
I-1H NS	28940-28NS	1.3	--	4
Method Blank	28940-25MB	ND	0.19	5
Method Blank	28940-25MBNS	9.4	--	5
WS-1	28940-25	9.6	--	5
WS-2	28940-26	ND	0.61	5

APPENDIX A

BORING LOGS

BORING LOG

SITE ID: East Lagoon
LOCATION ID: A
METHOD : Vibracore, Split Spoon, Driven
DATE STARTED: 10 March 1987
FIELD REP: R. McAlister
DATE COMPLETE: 11 March 1987
WATER DEPTH: 1.75 FT.
BACKGROUND OVA: Set to 1.0 units

DEPTH (FT)	DESCRIPTION
0 - 1.6	Med. brown silt, soft, w/abundant opaque, white, bladed crystals, 0.5 in. long (approx.), semiconsolidated. OVA: 15 - 20 units. Sample: A-1 (vibracore), 0.5 - 1.5 ft.
1.6 - 2.25	Black tar, soft, w/trace brown silt. OVA: to 10 units. Sample: A-2-SS (Split Spoon) 1.8 - 2.2 ft.
2.25 - 2.6	Med. gray, fine sand and silt, trace black tar. OVA: 4 - 8 units. Sample: A-3-SS, 2.3 - 2.5 ft.
2.6 - 4.8	Black, soft tar, trace silt, trace debris. OVA: 4 - 6 units. Sample: A-4-SS, 1.8 - 2.4 ft.
4.8 - 5.7	Dark brown, soft peat and silt, trace fine sand, with abundant roots. (MEADOW MAT) OVA: 2 - 3 units.
	TOTAL DEPTH: 5.7 ft.

NOTES: See text for location of boring.

WESTON

BORING LOG

SITE ID: East Lagoon
LOCATION ID: B
METHOD : Vibracore; Split Spoon, Drive
DATE STARTED: 10 March 1987
FIELD REP: R. McAlister
DATE COMPLETE: 10 March 1987
WATER DEPTH: 0.7 FT
BACKGROUND OVA: Set to 1.0

DEPTH (FT)	DESCRIPTION
0 - 1.4	Med. brown silt, soft, w/abundant opaque, white, bladed crystals, 0.5 in. long (approx.), semiconsolidated. OVA: 15 - 20 units. Sample: B-1 (vibracore) 0.4 - 1.2 ft.
1.4 - 3.4	Black tar, soft, w/some med. brown silt. OVA: 10 units.
3.4 - 4.0	Med. brown silt and olive green sand, f., red gravel, soft, w/some crystals, bladed and granular. OVA: 10 - 15 units. Sample: B-2-SS (Split Spoon), 3.5 - 4.8 ft.
4.0 - 6.0	Black tar, soft, w/trace to little brown silt. Brick and wood fragments throughout. OVA: slowly increased to 10 units. Sample: B-3-SS, 4.3 - 5.0 ft. B-4-SS, 5.3 - 5.9 ft.
6.0 - 6.6	Dark brown peat and silt, w/trace fine sand, soft, with abundant roots. (MEADOW MAT) OVA: 2 - 3 units.
	TOTAL DEPTH: 6.6 ft.

NOTES: See text for location of boring. Approximately 1.0 ft. of material, from depth 2.4 to 3.4 was not recovered in the spoon. Because of the very low blow count, and because of residue identified on the outisde of the spoon, this material is assumed to have been tar.

WESTON

BORING LOG

SITE ID: West Lagoon
METHOD : Vibracore; Split Spoon, Driven
FIELD REP: R. McAlister
WATER DEPTH: 2.3 FT

LOCATION ID: C
DATE STARTED: 27 Feb. 1987
DATE COMPLETE: 10 Mar. 1987
BACKGROUND OVA: Set to 1.0

DEPTH (FT)	DESCRIPTION
0 - 1.0	Medium brown silt, soft, w/abundant opaque, white bladed crystals, 0.5 in. long (approx.), semiconsolidated. OVA: 15 - 20 units. Sample: C-1 (vibracore). 0 - 0.8 ft.
1.0 - 2.3	Black tar, soft, w/trace to little silt, brick and wood fragments. OVA: 20 units. Sample: C-2H-SS, 1.2 - 2.1 ft.
2.3 - 4.1	Black tar, soft, some brown-red silt. OVA: 5 - 7 units. Sample: C-3-SS, 3.4 - 3.9 ft.
4.1 - 5.4	Dark brown sand (medium), stained, and black tar, soft, w/brick fragments. OVA: 2 - 3 units. Sample: C-4-SS, 4.4 - 5.3 ft.
5.- - 6.0	Dark brown peat and silt, soft, trace fine sand, w/ abundant roots (MEADOW MAT). OVA: 2 - 3 units.
	TOTAL DEPTH: 6.0 ft.

NOTES: See text for location of boring.

WESTON

BORING LOG

SITE ID: West Lagoon
METHOD : Vibracore; Split Spoon, Driven
FIELD REP: R. McAlister
WATER DEPTH: 1.7 FT.

LOCATION ID: D
DATE STARTED: 26 Feb. 1987
DATE COMPLETE: 9 Mar. 1987
BACKGROUND OVA: Set to 1.0 units

DEPTH (FT)	DESCRIPTION
0 - 1.0	Medium brown silt, soft, w/some opaque, white, bladed crystals. Some black tar, wood fragments. OVA: to 25 units. Sample: D-1 (vibracore), 0.1 - 0.9 ft.
1.0 - 5.7	Black tar, soft, w/some medium brown silt at top. Trace fine sand, trace brick and wood debris. OVA: 20 units. Samples: D-2-SS, 2.0 - 2.5 ft. D-3-SS, 3.5 - 4.0 ft. D-4-SS, 5.0 - 5.5 ft.
5.7 - 6.5	Dark brown peat and silt, soft, trace fine sand, abundant roots (MEADOW MAT). OVA: 2 - 4 units.

TOTAL DEPTH: 6.5 ft.

NOTES: See text for location of boring.

WESTON

BORING LOG

SITE ID: West Lagoon
LOCATION ID: E
METHOD : Vibracore; Split Spoon, Driven
DATE STARTED: 26 Feb. 1987
FIELD REP: R. McAlister
DATE COMPLETE: 17 Mar. 1987
WATER DEPTH: 5.6 FT.
BACKGROUND OVA: Set to 1.0

DEPTH (FT)	DESCRIPTION
0 - 0.7	Black to brown tar, soft, medium brown silt and sand (f.) and opaque white to yellow granular crystals. OVA: 25 - 30 units. Samples: E-1 (vibracore), 0 - 0.5 ft.
0.7 - 1.4	Medium brown silt and sand (vf.) and black tar, hard. OVA: to 12 units. Sample: E-2-SS, 0.8 - 1.3 ft.
1.4 - 2.4	Black tar mixed w/brown-red silt, w/abundant brick and wood debris. OVA: 7 - 8 units Samples: E-3-SS, 1.6 - 1.9 ft. E-4-SS, 2.0 - 2.3 ft.
2.4 - 2.8	Dark brown peat and silt, soft, trace fine sand abundant roots (MEADOW MAT). OVA: 2 - 4 units.
	TOTAL DEPTH: 2.8 ft.

NOTE: See text for location of boring.

WESTON

BORING LOG

SITE ID: West Lagoon
LOCATION ID: F
METHOD : Vibracore; Split Spoon, Driven
DATE STARTED: 26 Feb. 1987
FIELD REP: R. McAlister
DATE COMPLETE: 6 Mar. 1987
WATER DEPTH: 3.0 FT.
BACKGROUND OVA: Set to 1.0

DEPTH (FT)	DESCRIPTION
0 - 0.6	Medium brown silt, soft, w/abundant opaque white bladed crystals. Hard. OVA: to 25 units Sample: F-1 (vibracore), 0 - 0.6 ft.
0.6 - 5.5	Black tar, soft. * Sample: F-4-SS, 5.0 - 5.5 ft.
5.5 - 6.0	Dark brown silt and peat, soft, w/some brown to gray, fine to medium sand, abundant roots. (MEADOW MAT). OVA: 3.0.
	TOTAL DEPTH: 6.0 ft.

NOTES: See text for location of boring.
* Interval between 0.6 - 5.0 ft. was not recovered in four attempts. Hard material recovered from 0 - 0.6 ft. was believed to displace the very soft tar and prevent entry into the spoon.

BORING LOG

SITE ID: West Lagoon
LOCATION ID: G
METHOD : Vibracore, Split Spoon, Driven
DATE STARTED: 26 Feb. 1987
FIELD REP: R. McAlister
DATE COMPLETE: 6 Mar. 1987
WATER DEPTH: 3.0 FT.
BACKGROUND OVA: Set to 1.0

DEPTH (FT)	DESCRIPTION
0 - 1.0	Opaque, white, bladed crystals, 0.1 in. long (approx), hard, mixed w/dark brown to black silt and gravel. OVA: to 15 units. Sample: G-1 (vibracore), 0 - 0.8 ft.
1.0 - 3.0	Black tar, soft, w/trace brown silt. Trace wood fragments. OVA: 3 - 4 units. Sample: G-2-SS, 1.5 - 2.5 ft.
3.0 - 3.7	Medium brown sand (fine) and silt. OVA: 2 - 3 units. Sample: G-3-SS, 3.0 - 3.5 ft.
3.7 - 4.4	Black tar, very soft. OVA: 2 - 3 units. Sample: G-4-SS, 4.0 - 4.3 ft.
4.4 - 5.6	Dark brown peat and silt, soft, trace reddish brown gravel, abundant roots. (MEADOW MAT) OVA: 3 units.
	TOTAL DEPTH: 5.6 ft.

NOTE: See text for location of boring.

BORING LOG

SITE ID: West Lagoon
LOCATION ID: I
METHOD : Vibracore, Split Spoon, Driven
DATE STARTED: 27 Feb. 1987
FIELD REP: R. McAlister
DATE COMPLETE: 17 Mar. 1987
WATER DEPTH: 1.5 ft.
BACKGROUND OVA: Set to 1.0

DEPTH (FT)	DESCRIPTION
0 - 0.9	Opaque white, bladed crystals, mixed w/granular white crystals, hard. Trace of light brown silt, soft. OVA: to 50 units. Sample: I-1H (vibracore), 3 jars collected, 0 - 0.8 ft.
0.9 - 1.9	Dark brown to black, granular debris, w/abundant bladed crystals. OVA: to 20 units. Sample: I-2-SS, 1.3 - 1.8 ft.
1.9 - 4.1	Medium brown silt and sand (f.) mixed w/brick and wood fragments, abundant white bladed crystals throughout. OVA: to 20 units. Sample: I-3-SS, 2.5 - 3.5 ft.
4.1 - 5.5	Medium brown silt and sand (f) mixed w/tar (black, some brick and wood fragments. OVA: to 10 units. Sample: I-4-SS, 4.5 - 5.5 ft.
5.5 - 6.1	Black tar, thick, with some small brick fragments. OVA: 2 - 3 units.
6.1 - 6.7	Dark brown silt and peat, trace sand, abundant roots (MEADOW MAT). OVA: 2 - 3 units
	TOTAL DEPTH: 6.7 ft.

NOTE: See text for location of boring.

BORING LOG

SITE ID: East Lagoon
METHOD : Vibracore; Split-Spoon, Driven
FIELD REP: T. Marks
WATER DEPTH: 0.4 ft.
LOCATION ID: J
DATE STARTED: 27 Feb., 1987
DATE COMPLETE: 12 Mar., 1987
BACKGROUND OVA: Set to 1.0

DEPTH (FT)	DESCRIPTION
0 - 2.3	Opaque white, bladed crystals, w/trace lt. to med. brown silt, trace granular white crystals. OVA: to 90 units. Sample: J-1H (vibracore), 3 jars collected, 0.1 - 1.1 ft.
2.3 - 2.7	Lt. - med. brown silt, hard, mixed w/opaque white bladed crystals. OVA: >100 units. Sample: J-2-SS, 2.3 - 2.6 ft.
2.7 - 4.0	Dk. brown - black sand, loose, w/trace to some crystals, white-brown. OVA: 10-15 units. Sample: J-3-SS, 2.9 - 3.9 ft.
4.0 - 5.9	Black tar w/debris, predominantly small brick fragments. OVA: 2 - 5 units Sample: J-4-SS, 5.0 -5.8 ft.
5.9 - 6.2	Dark brown silt and peat, trace sand, roots (MEADOW MAT). OVA: 3 units
	TOTAL DEPTH: 6.2 ft.

NOTE: See text for location of boring.

WESTON

BORING LOG

SITE ID: East Lagoon
METHOD : Split-Spoon, Driven
FIELD REP: T. Marks
WATER DEPTH: 0.7 ft.

LOCATION ID: K
DATE STARTED: 12 Mar., 1987
DATE COMPLETE: 12 Mar., 1987
BACKGROUND OVA: Set to 1.0 unit

DEPTH (FT)	DESCRIPTION
0 - 1.5	Lt. brown and opaque white bladed crystals, hard, w/trace silt. OVA: 50-60 units. Sample: K-IH-SS, 3 jars collected, 0.1 - 1.1 ft.
1.5 - 2.3	Brown - opaque white, tar-stained crystals, mixed with runny tar. OVA: 30 units. Sample: K-2-SS, 1.7 - 2.2 ft.
2.3 - 3.2	Black tar mixed w/coarse granular debris, brick and wood fragments. OVA: 2-4 units. Sample: K-3-SS, 2.4 - 3.1 ft.
3.2 - 6.3	Black tar, loose, trace debris. OVA: 2-4 units. Sample: K-4-SS, 4.6-5.6 ft.
6.3 - 6.7	Dark brown silt and peat, trace sand, w/abundant roots (MEADOW MAT). OVA: 2-4 units.
	TOTAL DEPTH: 6.7 ft.

NOTE: See text for location of boring.

WESTON

BORING LOG

SITE ID: East Lagoon
METHOD : Split-Spoon,Driven
FIELD REP: T. Marks
WATER DEPTH: 0.5 ft.

LOCATION ID: L
DATE STARTED: 11 Mar., 1987
DATE COMPLETE: 11 Mar., 1987
BACKGROUND OVA: Set to 1.0 unit

DEPTH (FT)	DESCRIPTION
0 - 2.1	Brown - opaque white, bladed crystals, hard, trace to some silt. OVA: 10-15 units. Smaple: L-1H-SS, 3 jars collected, 0.2-1.2 ft.
2.1 - 3.8	Black- dark brown consolidated tar. Spoon refusal at 3.8 ft. OVA: 2-3 units. Samples: L-2-SS, 2.2 - 2.9 ft.; L-3-SS, 3.1 - 3.8 ft.
	TOTAL DEPTH: 3.8 ft.

NOTE: See text for location of boring.
Spoon refusal at 3.8 ft. No sample L-4-SS was collected.
Refusal noted after 50 minutes driving w/less than 0.2 ft. advancement.

BORING LOG

SITE ID: East Lagoon
METHOD : Split-Spoon, Driven
FIELD REP: T. Marks
WATER DEPTH: 1.5 Ft.

LOCATION ID: N
DATE STARTED: 12 Mar., 1987
DATE COMPLETE: 12 Mar., 1987
BACKGROUND OVA: Set to 1.0 unit

DEPTH (FT)	DESCRIPTION
0 - 0.8	Dark brown silt, tar stained, w/granular fill having coatings of tar. OVA: 20-23 units. Sample: N-1-SS, 0 - 0.8 ft.
0.8 - 1.6	Dark brown-black, opaque white, bladed crystals, hard; tar stains throughout. OVA: 20 units.
1.6 - 2.0	Black tar, hard. OVA: 10-13 units. Sample: N-2-SS, 1.7 - 2.0 ft.
2.0 - 4.7	Black tar, soft to runny, some fill material. OVA: 3-12 units. Samples: N-3-SS, 2.9 - 3.4 ft; N-4-SS, 4.0 - 4.6 ft.
4.7 - 5.3	Dark brown silt and peat, abundant roots (MEADOW MAT). OVA: 2-4 units.
	TOTAL DEPTH: 5.3 ft.

NOTE: See text for location of boring.

BORING LOG

SITE ID: East Lagoon
METHOD : Split-Spoon, Driven
FIELD REP: T. Marks
WATER DEPTH: 0.8 ft.

LOCATION ID: 0
DATE STARTED: 13 Mar., 1987
DATE COMPLETE: 13 Mar., 1987
BACKGROUND OVA: Set to 1.0 unit

DEPTH (FT)	DESCRIPTION
0 - 1.2	Gray silt, loose, w/some bladed crystals (white). OVA: 2 - 5 units. Samples: 0-1-SS, 0-1.0 ft; 0-FP-SS*, 0 - 1.0 ft.
1.2 - 2.4	Dark brown-black, bladed crystals, hard; trace silt, trace tar. OVA: 7-12 units. Sample: 0-2-SS, 1.6 - 2.3 ft.
2.4 - 5.4	Black tar, soft; trace wood fragments, trace silt. OVA: 2 - 4 units. Samples 0-3-SS, 3.0 - 3.9 ft; 0-4-SS, 4.8 - 5.3 ft.
5.4 - 6.0	Dark brown silt and peat, abundant roots (MEADOW MAT) OVA: 2 - 4 units.
	TOTAL DEPTH: 6.0 ft.

NOTES: See text for location of boring.

*Sample 0-FP-SS, field performance sample collected under direction of DEP personnel. Assume conc. 2,3,7,8-TCDD=zero, spike at 1ppb.

WESTON

BORING LOG

SITE ID: East Lagoon
METHOD : Split-Spoon, Driven
FIELD REP: T. Marks
WATER DEPTH: 1.0 ft.

LOCATION ID: P
DATE STARTED: 13 Mar., 1987
DATE COMPLETE: 13 Mar., 1987
BACKGROUND OVA: Set of 1.0 unit

DEPTH (FT)	DESCRIPTION
0 - 0.9	Tan, black, opaque, bladed crystals, interlocking, hard. OVA: to 20 units. Sample: P-1-SS, 0-0.8 ft.
0.9 - 1.3	Gray sand (f-m) w/some bladed crystals. OVA: 15 units.
1.3 - 1.8	Black tar, hard. OVA: 2 - 7 units. Sample: P-2-SS, 1.3 - 1.8 ft.
1.8 - 4.9	Black tar, soft, w/some granular material, trace wood fragments. OVA: 2 - 5 units. Samples: P-3-SS, 2.7 - 3.4 ft.; P-4-SS, 4.0 - 4.8 ft.
4.9 - 5.3	Dark brown peat and silt, w/abundant roots, trace sand (f), (MEADOW MAT). OVA: 2 - 3 units.
	TOTAL DEPTH: 5.3 ft.

NOTE: See text for location of boring.

WESTON

BORING LOG

SITE ID: East Lagoon
METHOD : Split-Spoon, Driven
FIELD REP: T. Marks
WATER DEPTH: 0.4 ft.

LOCATION ID: Q
DATE STARTED: 11 Mar., 1987
DATE COMPLETE: 11 Mar., 1987
BACKGROUND OVA: Set of 1.0

DEPTH (FT)	DESCRIPTION
0 - 2.2	Medium brown, opaque, bladed crystals, trace to some brown silt. OVA: to 25 units. Samples: Q-1-SS, 0.3 - 0.8 ft; Q-1D-SS, 0.3 - 0.8 ft.
2.2 - 2.6	Medium-dark brown, opaque crystals mixed w/black tar. OVA: 6-11 units. Samples: Q-2-SS, 2.2 - 2.6 ft; Q-2D-SS, 2.2 - 2.6 ft.
2.6 - 3.1	Dark brown - black tar and sand (f.). OVA: 2 - 6 units. Samples: Q-3-SS, 2.7 - 3.1 ft; Q-3D-SS, 2.7 - 3.1 ft.
3.1 - 5.3	Black tar, soft, w/some brown silt. OVA: 2 - 4 units. Samples: Q-4-SS, 4.0- 5.0 ft; Q-4D-SS, 4.0-5.0 ft.
5.3 - 6.5	Dark brown silt, w/abundant peat, some root fragments (MEADOW MAT). OVA: 2 - 4 units.
	TOTAL DEPTH: 6.5 ft.

NOTE: See text for location of boring.

BORING LOG

SITE ID: East Lagoon
METHOD : Split-Spoon, Driven
FIELD REP: T. Marks
WATER DEPTH: 0.6 ft.

LOCATION ID: R
DATE STARTED: 17 Mar., 1987
DATE COMPLETE: 17 Mar., 1987
BACKGROUND OVA: Set to 1.0 unit

DEPTH (FT)	DESCRIPTION
0 - 0.9	Medium-dark brown opaque, bladed crystals. OVA: to 25 units. Sample: R-1-SS, 0-0.8 ft.
0.9 - 3.2	Medium - dark brown, black tar stained, bladed crystals, w/zones of clean, opaque white crystals, tar content increases w/depth. OVA: to 40 units. Sample: R-2-SS, 2.5-3.2 ft.
3.2 - 6.7	Black tar, soft, w/wood and brick fragments, other debris. OVA: 6 - 10 units. Samples: R-3-SS, 4.2 - 5.0 ft. R-4-SS, 6.0 - 6.7 ft.
6.7 - 7.2	Medium - dark brown silt w/peat, root fragments. (MEADOW MAT). OVA: 2 - 4 units.
	TOTAL DEPTH: 7.2 ft.

NOTE: See text for location of boring.

WESTON

BORING LOG

SITE ID: East Lagoon
METHOD : Split-Spoon, Driven
FIELD REP: T. Marks
WATER DEPTH: 0.3 ft.

LOCATION ID: S
DATE STARTED: 16 Mar., 1987
DATE COMPLETE: 17 Mar., 1987
BACKGROUND OVA: Set to 1.0 unit

DEPTH (FT)	DESCRIPTION
0 - 2.6	Black, brown bladed crystals, trace silt. OVA: to 25 units. Samples : S-1-SS, 0.3 - 0.8 ft; S-2-SS, 1.8 - 2.6 ft.
2.6 - 4.2	Black tar, trace sand (f), very hard. OVA: slowly increased to 12 units. Sample: S-3-SS, 3.5 - 4.2 ft.
	TOTAL DEPTH: 4.2 ft.

NOTES: See text for location of boring.

Spoon refusal at 4.2 ft. No sample S-4-SS was collected. Refusal noted after 45 minutes driving w/no advancement.

BORING LOG

SITE ID: East Lagoon
METHOD : Split-Spoon Driven
FIELD REP: T. Marks
WATER DEPTH: 0.9 ft.

LOCATION ID: T
DATE STARTED: 13 Mar., 1987
DATE COMPLETE: 13 Mar., 1987
BACKGROUND OVA: Set to 1.0 unit

DEPTH (FT)	DESCRIPTION
0 - 1.5	Medium gray to black, bladed crystals, trace sand (f-m). OVA: to 20 units. Sample T-1-SS, p.5 - 1.5 ft.
1.5 - 3.2	Black tar, some sand (f), very hard. OVA: slowly increased to 10 units. Sample: T-2-SS, 2.5 - 3.2 ft.
	TOTAL DEPTH: 3.2 ft.

NOTES: See text for location of boring.

Spoon refusal at 3.2 ft. No samples T-3-SS or T-4-SS were collected. Refusal noted after 70 minutes driving w/no advancement.

Standard Chlorine Chemical Company, Inc.

Stage II and III Analysis Report for:

Sampling and Analysis of Potentially Dioxin - Contaminated Materials in Waste Lagoons

Standard Chlorine Chemical Company
Kearny, New Jersey

Summary of Stage II and III Efforts
Stage II and III Analytical Report

May 1988

WESTON
MANAGERS DESIGNERS/CONSULTANTS

DEL. 302 834-4536
NJ. 201 997-1700
TWX 510-666-1629
STD CLOR DECI

STANDARD CHLORINE OF DELAWARE, INC.

GOVERNOR LEA ROAD • P.O BOX 319 • DELAWARE CITY, DELAWARE 19706

May 5, 1988

Ms. Christine Altomari
Case Manager
New Jersey Department of Environmental Protection
Division of Hazardous Waste Management
401 East State Street--CN-028
Trenton, New Jersey 08625

RE: SCCC Kearny Facility

Dear Ms. Altomari:

Enclosed please find a report prepared by Roy F. Weston, Inc., which contains the results of analysis for 2,3,7,8 TCDD of the Stage II and III samples from the Kearny facility lagoon. The report contains Weston's findings and their recommendations for additional work at the site. This completes the sampling and analytical work called for in the workplan submitted to and approved by the NJDEP.

In addition, we are proposing that the distillation building be handled in the following manner.

We propose that SCCC hire an approved asbestos removal contractor to thoroughly sweep and vacuum the interior of the building and remove all friable asbestos material in accordance with state and federal regulations. A representative sampling of 20% of the bags of sweepings and asbestos material will be taken and analyzed for 2,3,7,8 TCDD and if undetectable levels are found in those samples, all of the bags will be disposed as asbestos contaminated solid waste. If on the other hand, contamination by 2,3,7,8 TCDD is found in any bag, all bags will be considered dioxin contaminated and will be placed in drums and stored on site.

Once the building has been thoroughly cleaned and friable asbestos has been removed and properly contained, we propose that all interior surfaces of the building be sprayed with an encapsulating chemical polymer which will ef-

fectively seal all internal surfaces from human or environmental exposure. We believe that this is the most effective way of dealing with the potential dioxin contamination which may exist within the building. Once NJDEP has approved this concept, we will obtain and review proposals, select a contractor, and submit an implementation schedule to NJDEP within 60 days.

As requested in your February 9, 1988 letter, I will be contacting your office within the next several days to schedule a meeting to review both summary reports on the lagoon sampling and our proposal for handling the distillation building. Please feel free to contact me should you have any questions regarding the above.

Sincerely,

Robert J. Touhey, P.E.
Asst. Vice President
Environmental Affairs

RJT/pm

Enclosure

cc: A. R. Sinibaldi
M. L. Wiener
N. A. Stufano

Stage II and III Analysis Report For:

Sampling and Analysis of Potentially Dioxin-Contaminated Materials in Waste Lagoons at the Standard Chlorine Chemical Company Facility Kearny, New Jersey

Prepared For:

Standard Chlorine Chemical Company, Inc.
1035 Belleville Turnpike
Kearny, New Jersey 07032

May 1988

Prepared By:

Roy F. Weston, Inc.
Weston Way
West Chester, Pennsylvania 19380

TABLE OF CONTENTS

LIST OF FIGURES

WESTON

SECTION 1

INTRODUCTION

1.1 BACKGROUND

Samples have been collected at the Standard Chlorine Chemical Company (SCCC) facility in Kearny, New Jersey, on two occasions under the New Jersey Department of Environmental Protection (NJDEP) Dioxin Program. These samples were collected first by E.C. Jordan under contract to NJDEP, and second by Roy F. Weston, Inc. (WESTON) under contract to SCCC. A summary of locations and results of sampling of surficial and deep samples collected during this 1985 investigation was included as Appendix C (Volume III) of the Stage I Report of Analysis, submitted September, 1987. All samples have been analyzed by NJDEP certified laboratories using Regular Analytical Services (RAS) (low-resolution GC/MS). Results prior to 1987 indicated that levels of dioxin (2,3,7,8-TCDD) ranging from 3 to 62 ppb were present at three locations at the facility:

- Distillation Pot
- Northeast corner of West Lagoon
- Northwest corner of East Lagoon

NJDEP indicated their decision to classify portions of the SCCC facility as a dioxin site, and requested that SCCC proceed with additional sampling and analysis to determine the magnitude and extent of the cleanup effort needed.

1.2 SCOPE OF WORK

The scope of work undertaken has been subdivided into a sequence of tasks, as follows:

Task I - Sampling of materials within the lagoons at points distributed over a grid encompassing both lagoons. Additionally, collection of two surface soil samples (0-0.5 ft.) outside the lagoons and two wipe samples (within the distillation building) at locations selected by NJDEP personnel.

Task II- Laboratory analyses of samples collected during Task I.

Task III - Data evaluation

Task IV - Meeting

Each of these tasks are discussed in greater detail in the following paragraphs.

1.2.1 Task I - Sampling

1.2.1.1 Sample Collection

Sampling of lagoon materials (and collection of other samples) was executed during 25 February - 18 March, 1987. Sample locations, keyed to a 50 ft. - interval grid, are shown on Figure 1-1. Included were 7 locations within the west lagoon and 13 locations within the east lagoon, as agreed upon with NJDEP personnel. Three stratigraphic cross-sections through the lagoons (and including lagoon perimeter borings executed in 1985), along with a location map for the cross-sections, are included as Figures 1-2, 1-3, 1-4, and 1-5. Boring logs were included as Appendix A in the Stage I report.

During 25-27 February 1987, sampling was attempted using a vibracore system. The vibracore, designed to penetrate soft, predominantly fine-grained materials, as were expected to constitute the lagoon materials, would permit collection of a continuous core through the entire thickness of the emplaced waste materials. The vibracore proved unsuccessful, because repeated attempts to penetrate the wastes revealed the existence of consolidated or semi-consolidated materials and coarse debris which caused refusal of the vibracore tubes in the upper 3-5 feet of waste materials. During that period we discussed potential alterations to the field program to accommodate this shallower penetration, but it was decided to proceed with alternate sampling methods to obtain samples from the depth intervals as approved by NJDEP in the Work Plan.

Beginning on 4 March 1987, sampling was initiated with a new technique. The new technique was a modification of the wash-bore technique approved by NJDEP, a modification expected to be necessary since it was anticipated that the approved water-jetting system would not be able to remove the large chunks of crystalline material encountered by the vibracore. This technique involved utilizing two 5-foot long, 3-inch diameter split-spoon samplers which were driven into the wastes with a standard 140 lb. hammer. The hammer was lifted by a portable tripod and gasoline powered cathead system, essentially a modified Standard Penetration Test. At each location, the first spoon was driven to its full depth, was removed from the hole, and a second spoon was immediately placed in the borehole, and driven to an approximate elevation corresponding to the depth of the native "meadow mat" materials, then removed. This method

proved effective in penetrating the full thickness of the waste materials in all but three locations (all in the east lagoon). At these locations, very hard materials encountered at a depth of approximately 3-5 feet caused refusal of the spoon (at least thirty minutes of hammer blows were performed in each case, with no advancement). During the time period of 4 March to 13 March 1987, following telephone conversations between NJDEP personnel and WESTON, it was agreed that the alternate technique of sampling would be acceptable and that samples collected by the alternate technique would be acceptable to the Department.

1.2.1.2 Environmental Samples

The sampling plan for the project called for a total of 80 core samples to be collected, along with two surface soil samples and two wipe samples.

A total of 74 core samples was obtained from the lagoons. Of the missing six samples, four were the result of bit refusal (as noted above). Two other samples could not be obtained from the central portion of a core taken from the west lagoon due to repeated non-recovery in the split-spoons (core "F"). It is believed that a very soft layer of tar-like material is present in the "F" area, and that relatively hard materials already in the spoon simply pushed the tar-like waste out of the way as the spoon was driven into the waste. Four attempts were made in an approximately 10-foot by four-foot area, all with the same result.

The two surface soil samples (SS-1 and SS-2) were collected at locations identified in the field by NJDEP personnel. Inside the distillation pot building, a wipe sample (WS-1) and a residue sample (RS-1) were collected, also at locations selected by NJDEP personnel.

1.2.1.3 Performance Samples

The sampling plan for the project called for a total of eight performance samples to be provided by the NJDEP. In addition, four field duplicates were called for, along with a blank wipe sample.

Five performance samples were provided by the NJDEP, and in accordance with instructions from NJDEP, the sample lots have been prepared with this reduced number of performance samples. In addition, the WESTON field team was instructed to obtain a shallow grab sample from the southeast corner of the east lagoon to be utilized as a field blank performance sample for Stage 1 Batch 1 lab analysis. The sample, according to NJDEP direction, was to be sent to the lab with

instruction that the suspected 2,3,7,8-TCDD concentration was zero, and that the lab should spike the sample at 1 ppb and analyze. The four field duplicates were collected, as was the blank wipe sample (WS-2) (hexane).

Under direction from NJDEP personnel, WESTON also instructed the analytical laboratory to utilize a sample from the initial batch of analyses (Batch 1) which did not show the presence of 2,3,7,8-TCDD, as a blank performance sample in each of the three subsequent batches (see below). Each sample was to be spiked in the laboratory, and analyzed with each of the three remaining batches.

1.2.2 Task II - Laboratory Analyses

All laboratory analyses were performed by Enseco, Inc. (California Analytical Laboratory), an NJDEP approved contract lab, under direct contract with SCCC. The analytical method used is the USEPA approved protocol for 2,3,7,8-TCDD ("Determination of 2,3,7,8-TCDD in Soil and Sediment", USEPA Region VII, 09/83), in compliance with all RAS requirements (as contained in EPA-CLP-IFB No. WA84-A002). Laboratory reports were submitted to SCCC in a Standard Contract Laboratory Program (CLP) format.

Analysis of samples was undertaken in three stages. Except for the eight samples collected from locations "I" and "J" (see Figure 1-1), from which all four samples at each location were submitted, the first stage of analyses (Stage I) included only the two uppermost samples from each boring. Also included were the two surface soil samples (SS-1 and SS-2) and the two wipe samples (WS-1, RS-1), including a blank (WS-2). The remaining samples, the third sample down from all remaining borings representing Stage II and the fourth sample down representing Stage III, were held in the custody of Enseco. As stated in the Work Plan, Stage II samples would be analyzed only where the immediately overlying samples show concentration of 2,3,7,8-TCDD above the 1 ppb action concentration. Similarly, fourth level samples (Stage III) would be analyzed only where Stage II results exceed 1 ppb for 2,3,7,8-TCDD.

1.2.3 Results of Stage I

Results of Stage I anlayses were presented in detail in the Stage I Analysis Report, submitted to the NJDEP in September, 1987. Briefly summarized, analyses indicated the presence of 2,3,7,8-TCDD above 1 ppb in the shallow (Batch 1) samples at locations A, B, C, G, J, K, and R. Second

provide range of concentrations

011

level (Batch 2) analyses indicated the presence of 2,3,7,8-TCDD above 1 ppb at locaitons E, I, K, and R. Values ranged from 2.7 ppb to 62.1 ppb. Trace levels of 2,3,7,8-TCDD were also identified in a wipe sample and a residue sample collected from inside the distillation building.

Based upon the results of the Stage I analyses, in accordance with procedures outlined in the Work Plan, Stage II and III samples were analyzed from locations where second level (Batch 2) samples indicated the presence of 2,3,7,8-TCDD above 1 ppb. Because all four samples from location I were analyzed during Stage I, Stage II and III analyses were performed on samples from locations E, K, and R. Details regarding Stage II and III analyses are presented in Section 2.

WESTON

SECTION 2

RESULTS OF STAGES II AND III

Results of 2,3,7,8-TCDD analysis for Stage II and Stage III samples are summarized in Table 2-1. Included are WESTON sample identification numbers, Enseco identification numbers, 2,3,7,8-TCDD concentrations measured in parts per billion (ppb), and 2,3,7,8-TCDD detection limits in ppb where applicable. The support documentation for the Stage II and III analyses is included in Appendix A.

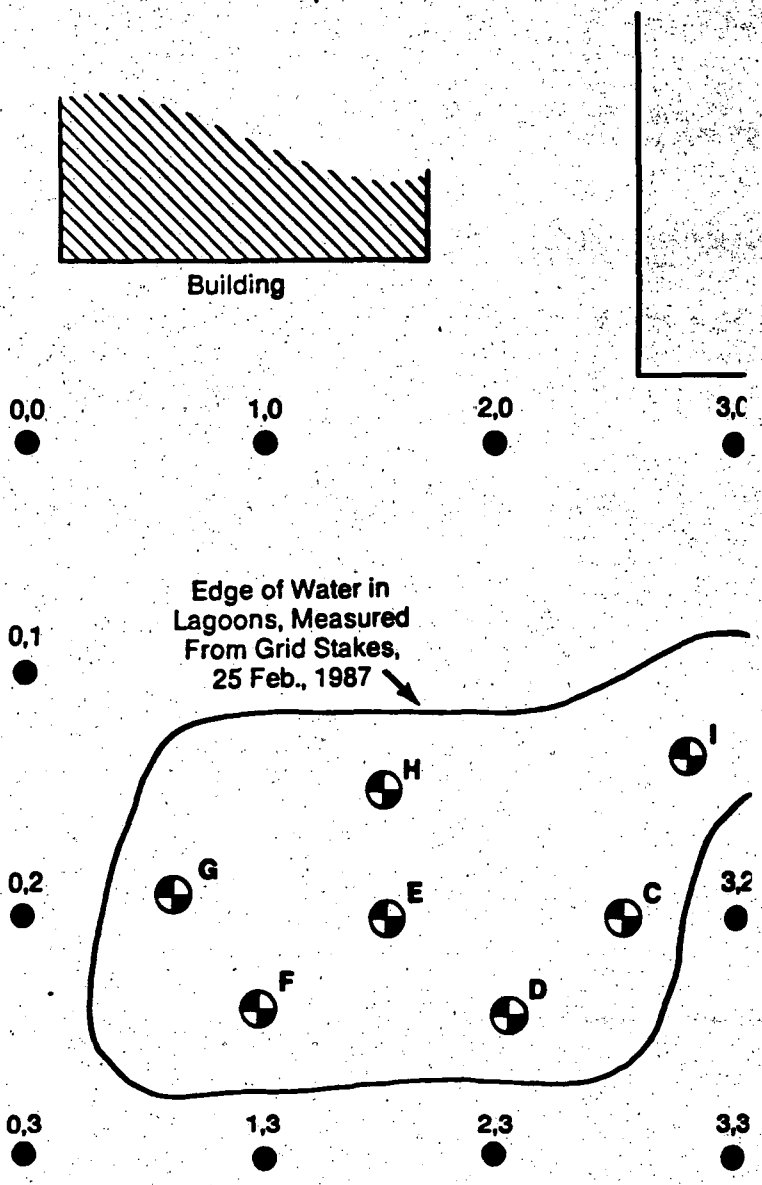
2.1 PERFORMANCE SAMPLES

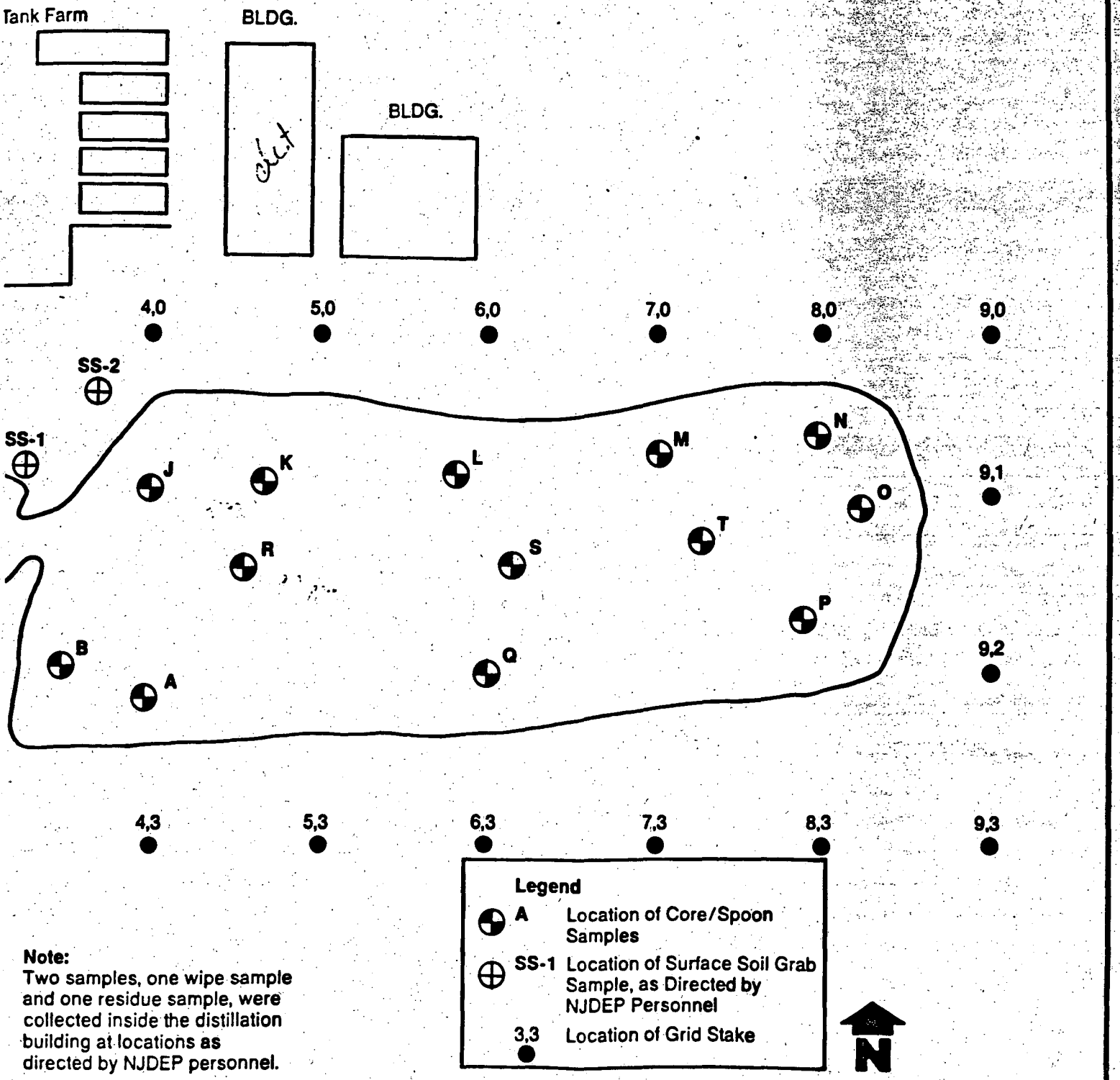
Stage II and III performance samples included: four method blanks; two duplicate analyses (R-4-SS Dup and 1-3-SS [040484-64D]); two native spikes, labeled with sample numbers and the subscript NS; and two samples provided by the NJDEP, labeled STDCL-4B and STDCL-3A. Results of analyses of the performance samples are summarized in Table 2-1; documentation is presented in Appendix A.

2.2 ENVIRONMENTAL SAMPLES

In accordance with recommendations presented in the Stage I Report of Analysis, and with concurrence from NJDEP, Stage II samples were analyzed from locations where immediately overlying samples indicated 2,3,7,8,-TCDD concentrations greater than the 1 ppb level. These were sample locations E, K, and R. WESTON and SCCC also instructed Enseco to perform Stage III analyses at these sample locations, thus eliminating delays involved in completing two separate rounds of analysis.

Samples F-1, J-2-SS, J-3-SS, and J-4-SS, which were initially submitted for Stage I analysis, were reanalyzed in Stage II and III using the best available analytical technology, as approved in the letter from NJDEP to SCCC (undated) received 9 February, 1988. These repeat efforts involving analytical modifications were necessitated by matrix interferences which prohibited analysis during Stage I. Sample 0-2-SS was also repeated during Stage II and III to resolve concern over the performance check solution time which was exceeded during Stage I efforts.

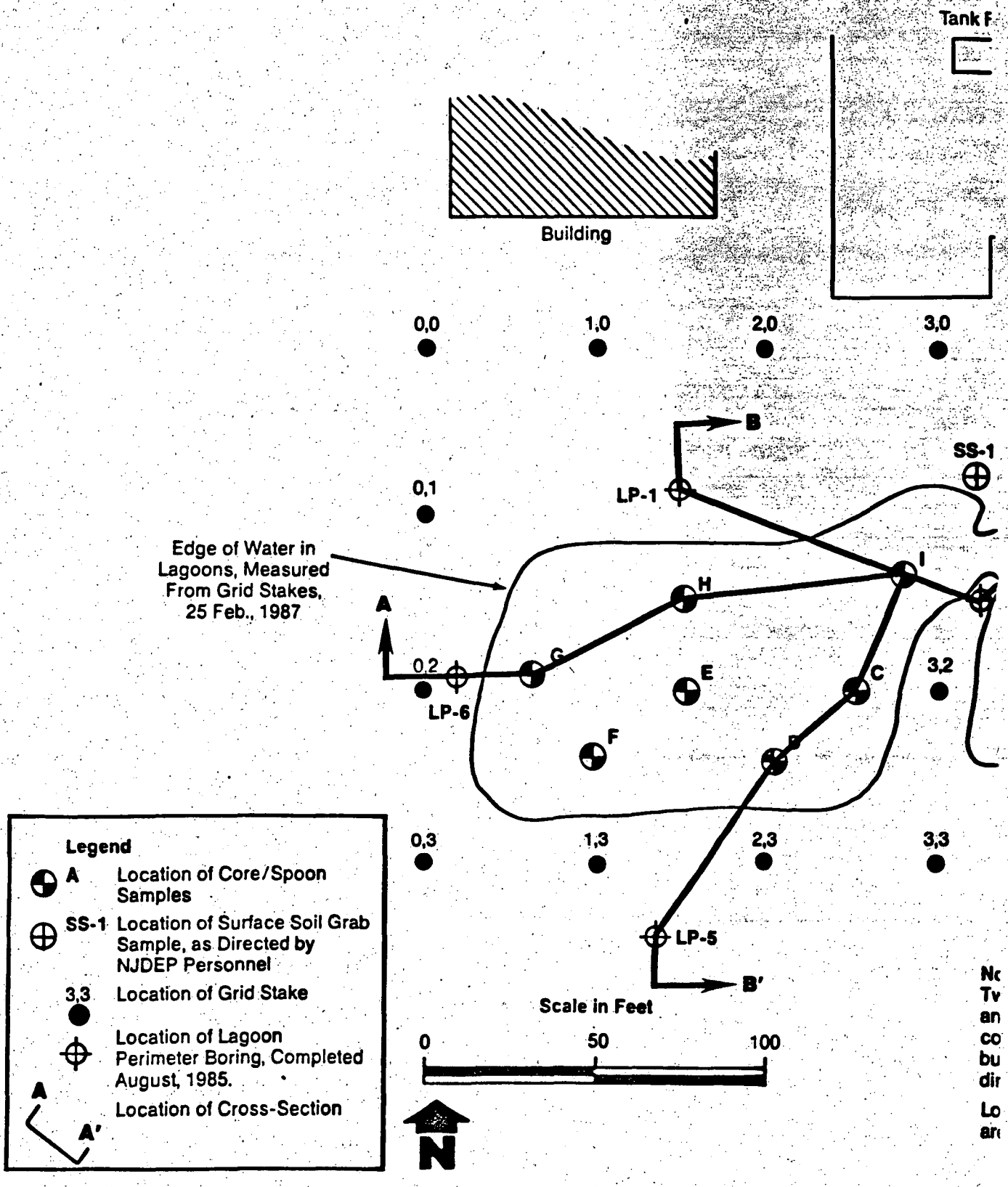

Building
0,0
1,0
2,0
3,0
Edge of Water in Lagoons, Measured From Grid Stakes, 25 Feb., 1987
0,1
H
I
G
0,2
E
C
3,2
F
D
0,3
1,3
2,3
3,3
Scale in Feet
0
50
100

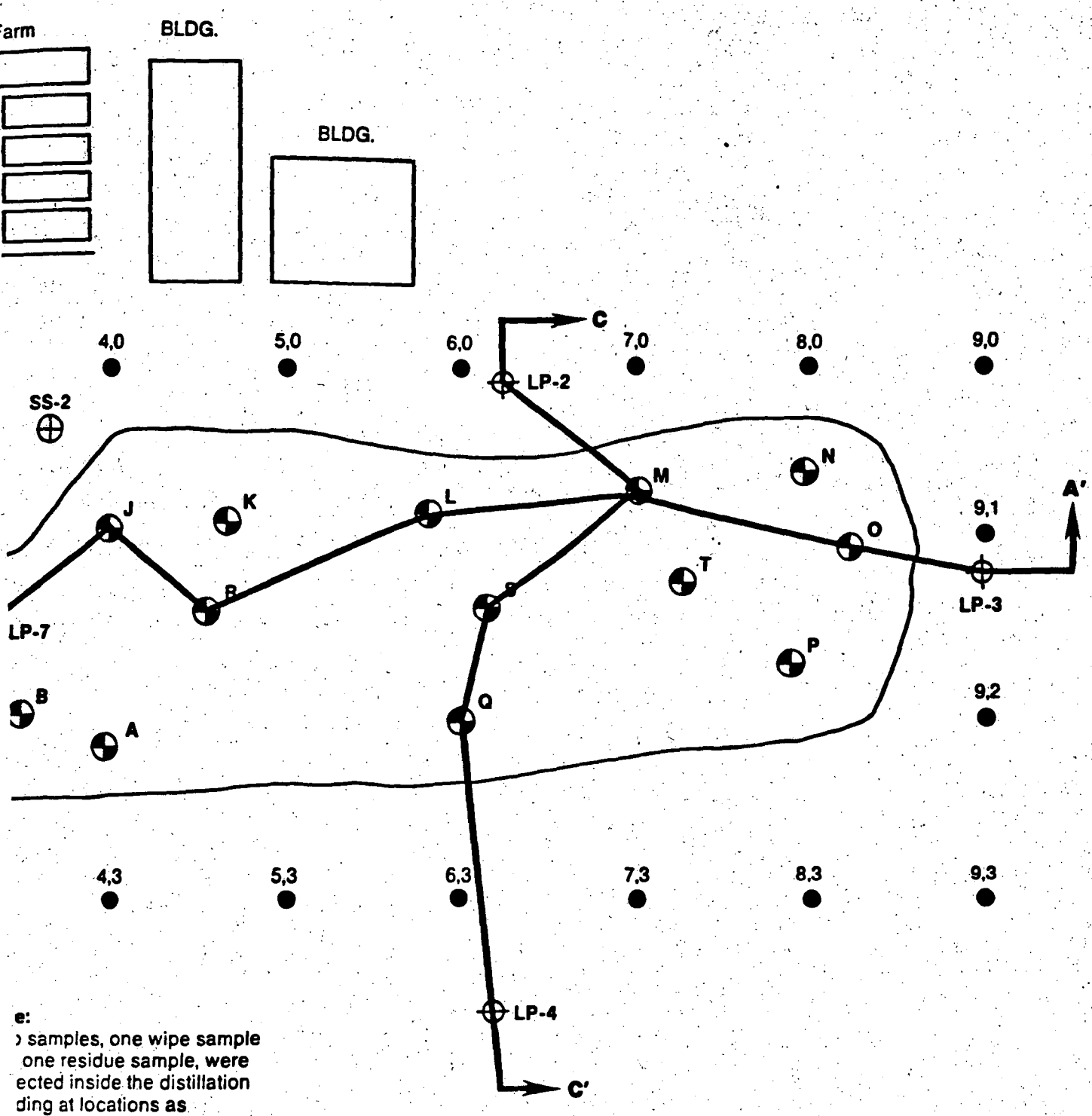


Note:
Two samples, one wipe sample and one residue sample, were collected inside the distillation building at locations as directed by NJDEP personnel.

Locations of buildings and tank areas not surveyed.

FIGURE 1-1 SAMPLE LOCATIONS, DIOXIN SAMPLING STANDARD CHLORINE CHEMICAL COMPANY, KEARNY, NEW JERSEY

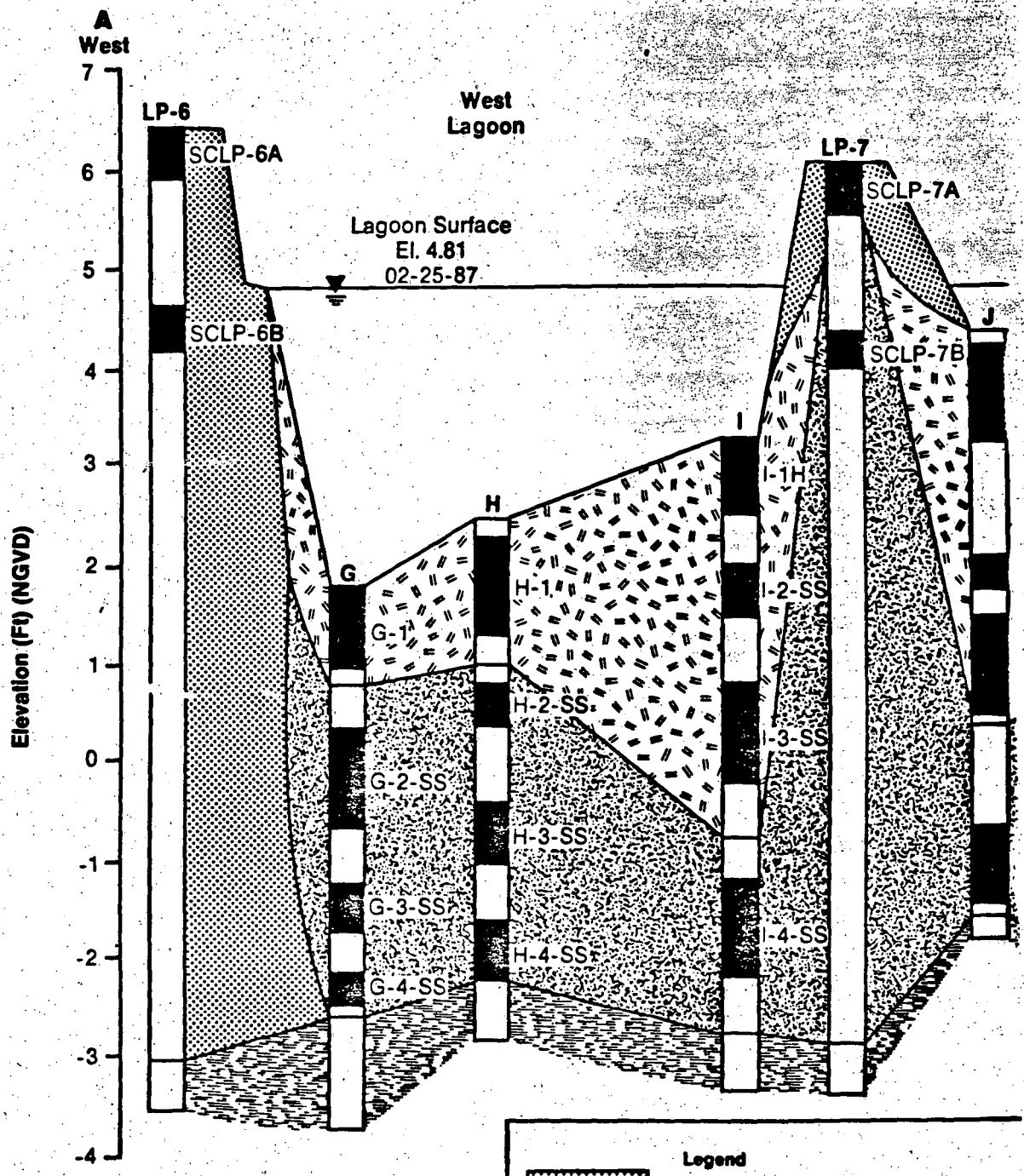

Tank F
Building
0,0
1,0
2,0
3,0
B
SS-1
0,1
LP-1
Edge of Water in Lagoons, Measured From Grid Stakes, 25 Feb., 1987
I
H
A
G
0,2
E
C
3,2
LP-6
F
0,3
1,3
2,3
3,3
LP-5
B'
Scale in Feet
0
50
100
N
Legend
A
Location of Core/Spoon Samples
SS-1
Location of Surface Soil Grab Sample, as Directed by NJDEP Personnel
3,3
Location of Grid Stake
Location of Lagoon Perimeter Boring, Completed August, 1985.
A
A'
Location of Cross-Section



e:
› samples, one wipe sample
one residue sample, were
ected inside the distillation
ding at locations as
cted by NJDEP personnel.

ations of building and tank
ıs not surveyed.

FIGURE 1-2 LOCATIONS OF STRATIGRAPHIC CROSS-SECTIONS THROUGH LAGOONS - STANDARD CHLORINE CHEMICAL COMPANY, KEARNY, NEW JERSEY

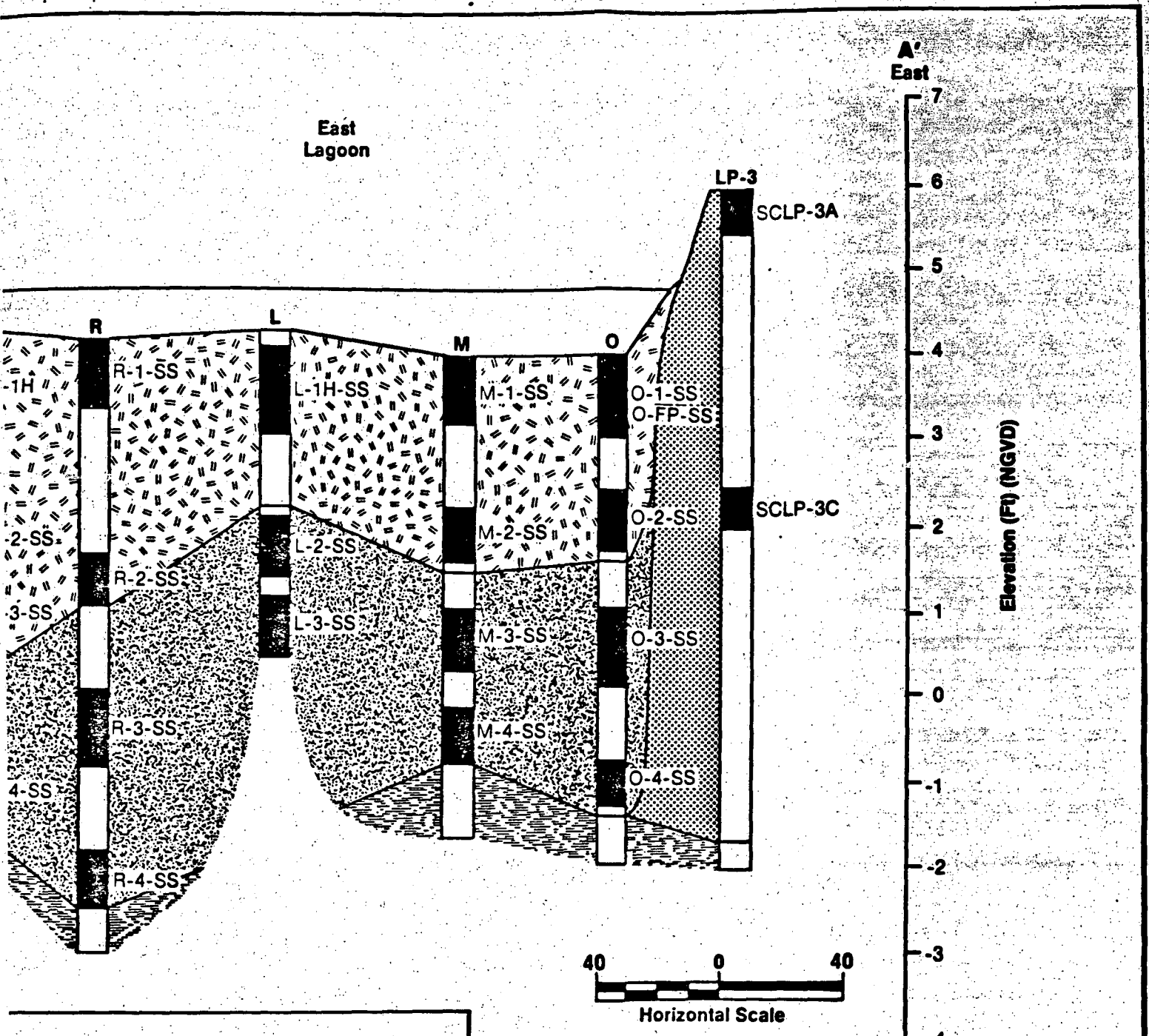


Legend

Fill Material - Granular Chromium Slag Mixed With Variable Proportions of Sand, Gravel, Silt, and Clay. Some Ash-Like Material, Brick and Wood Debris Present.

Waste - Predominantly White to Brown, Bladed Crystals Mixed With Variable Proportions of Silt, Minor Sand (f-m). In Places Contains Traces of Tar, Brick and Wood Debris.

Waste - Predominantly Black Tar, Soft to Hard. Contains Variable Proportions of Brick and Wood Debris, Silt, and Sand (f-m). Traces of Granular White Crystals, Granular Chromium Slag.



Meadow Mat - Medium to Dark Brown Silt and Peat, With Abundant Roots, Trace to Some Sand (f).

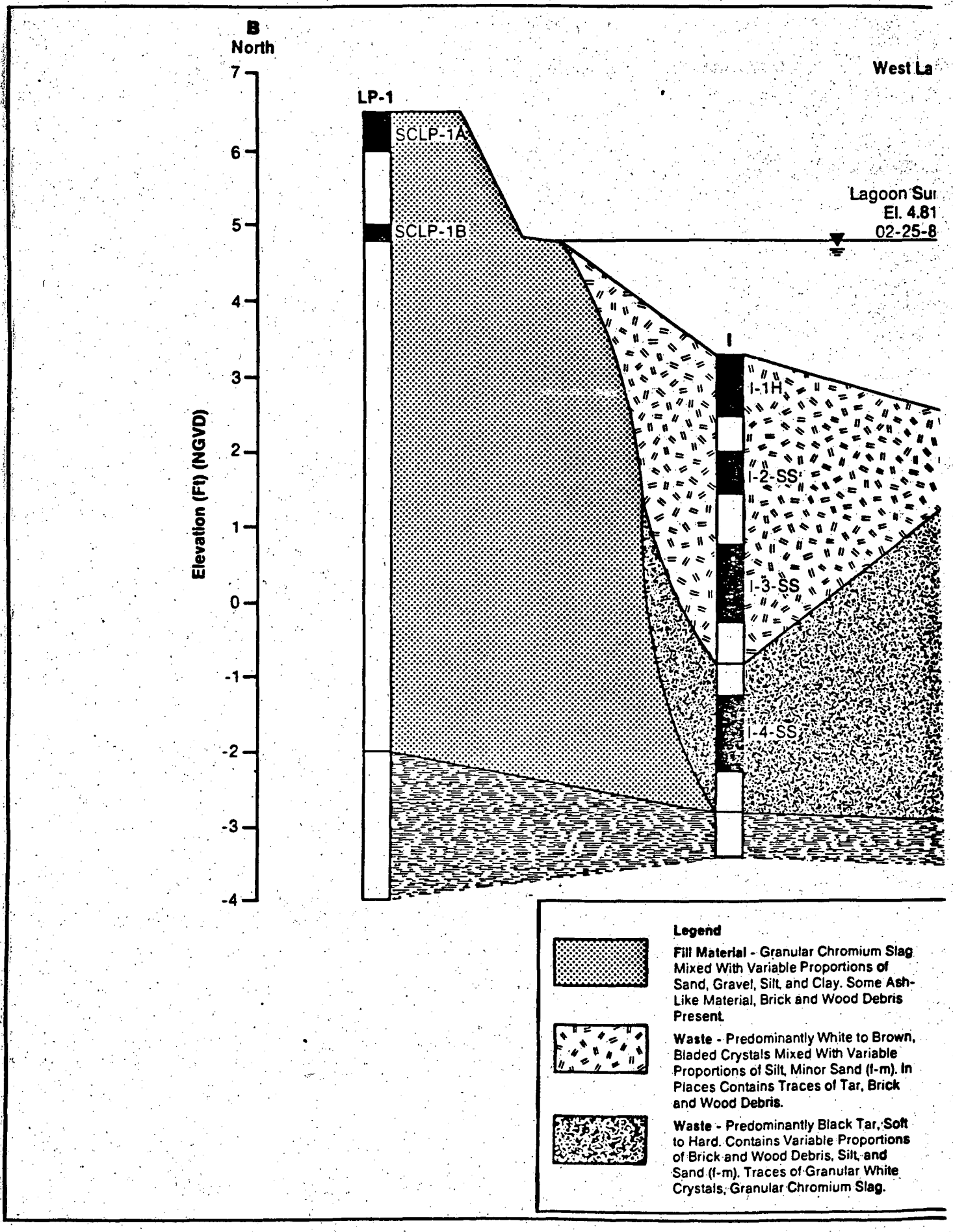
L — Boring/Vibracore/Split-Spoon Location Designation

Represents Boring/Vibracore/Split-Spoon Sample Location and Depth

L-1H-SS — Represents Actual Sample Interval and Letter/Number Designation

Represents Stratigraphic Contact

FIGURE 1-3 STRATIGRAPHIC CROSS-SECTION A-A'


B
North
West La
LP-1
SCLP-1A
SCLP-1B
Lagoon Sur
El. 4.81
02-25-8
I
I-1H
I-2-SS
I-3-SS
I-4-SS
Elevation (Ft) (NGVD)
7
6
5
4
3
2
1
0
-1
-2
-3
-4
Legend
Fill Material - Granular Chromium Slag Mixed With Variable Proportions of Sand, Gravel, Silt, and Clay. Some Ash-Like Material, Brick and Wood Debris Present.
Waste - Predominantly White to Brown, Bladed Crystals Mixed With Variable Proportions of Silt, Minor Sand (t-m). In Places Contains Traces of Tar, Brick and Wood Debris.
Waste - Predominantly Black Tar, Soft to Hard. Contains Variable Proportions of Brick and Wood Debris, Silt, and Sand (t-m). Traces of Granular White Crystals, Granular Chromium Slag.

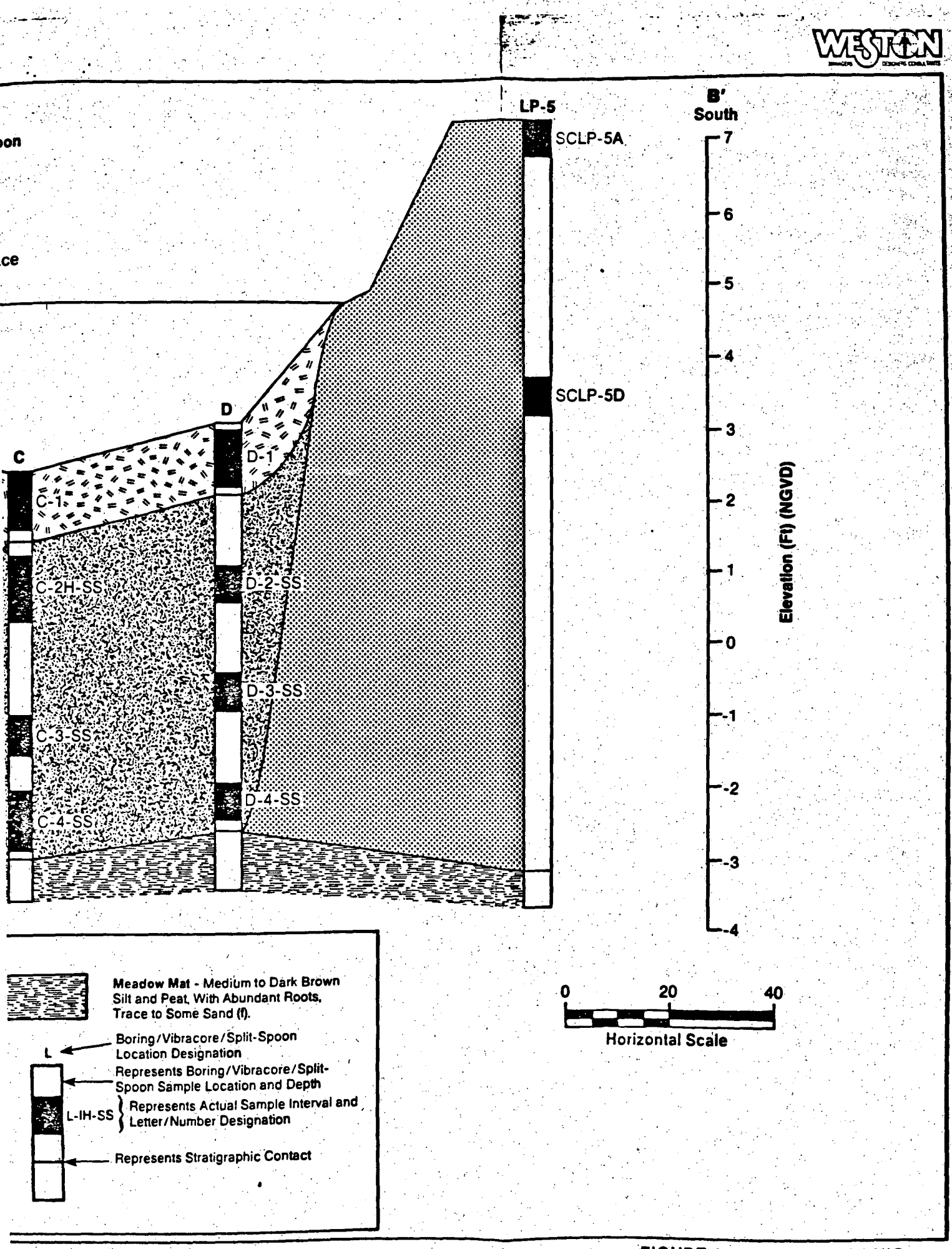
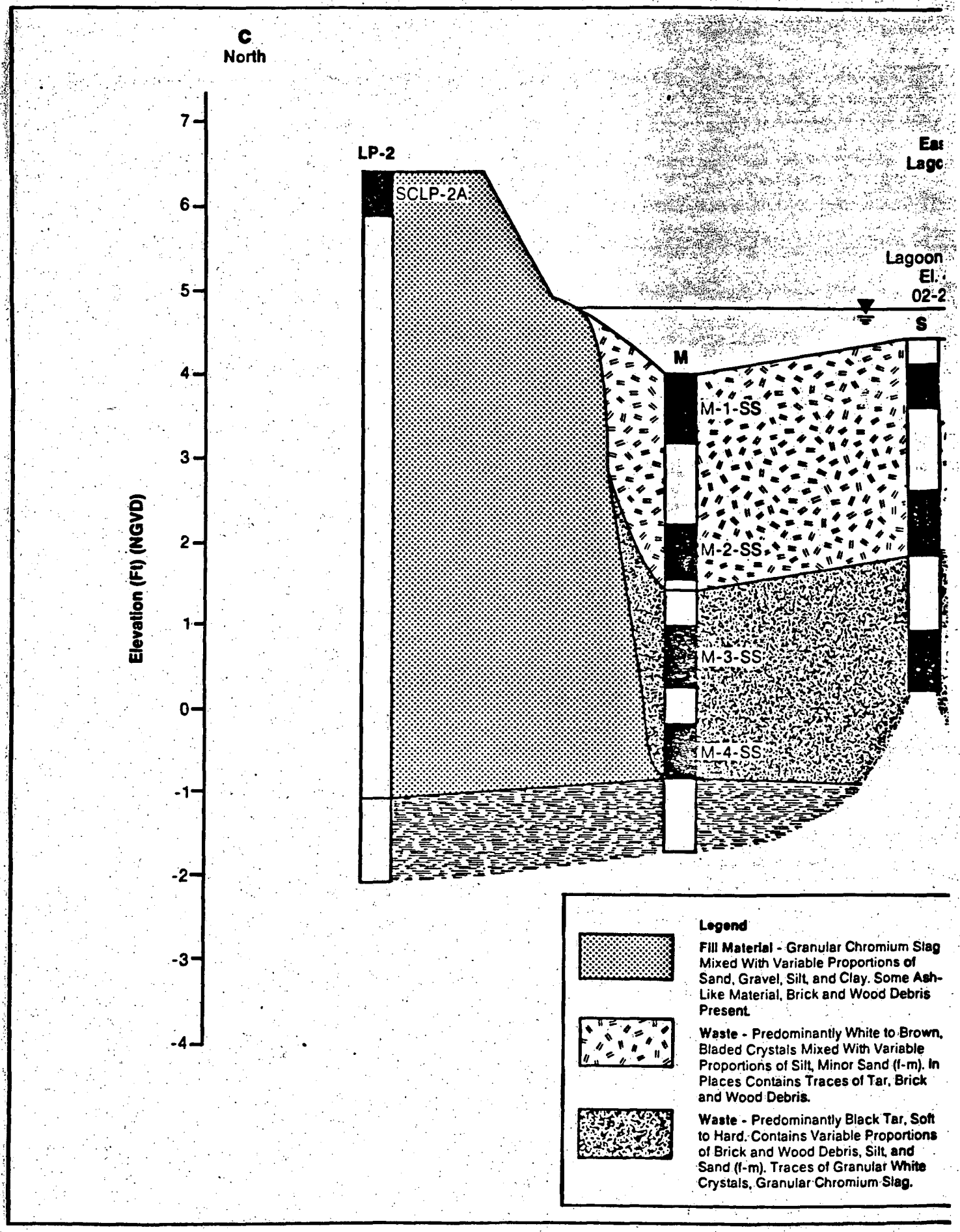


FIGURE 1-4 STRATIGRAPHIC CROSS-SECTION B-B'


C
North
Elevation (Ft) (NGVD)
7
6
5
4
3
2
1
0
-1
-2
-3
-4
LP-2
SCLP-2A
Lagoon
El.
02-2
S
M
M-1-SS
M-2-SS
M-3-SS
M-4-SS
Legend
Fill Material - Granular Chromium Slag Mixed With Variable Proportions of Sand, Gravel, Silt, and Clay. Some Ash-Like Material, Brick and Wood Debris Present.
Waste - Predominantly White to Brown, Bladed Crystals Mixed With Variable Proportions of Silt, Minor Sand (f-m). In Places Contains Traces of Tar, Brick and Wood Debris.
Waste - Predominantly Black Tar, Soft to Hard. Contains Variable Proportions of Brick and Wood Debris, Silt, and Sand (f-m). Traces of Granular White Crystals, Granular Chromium Slag.

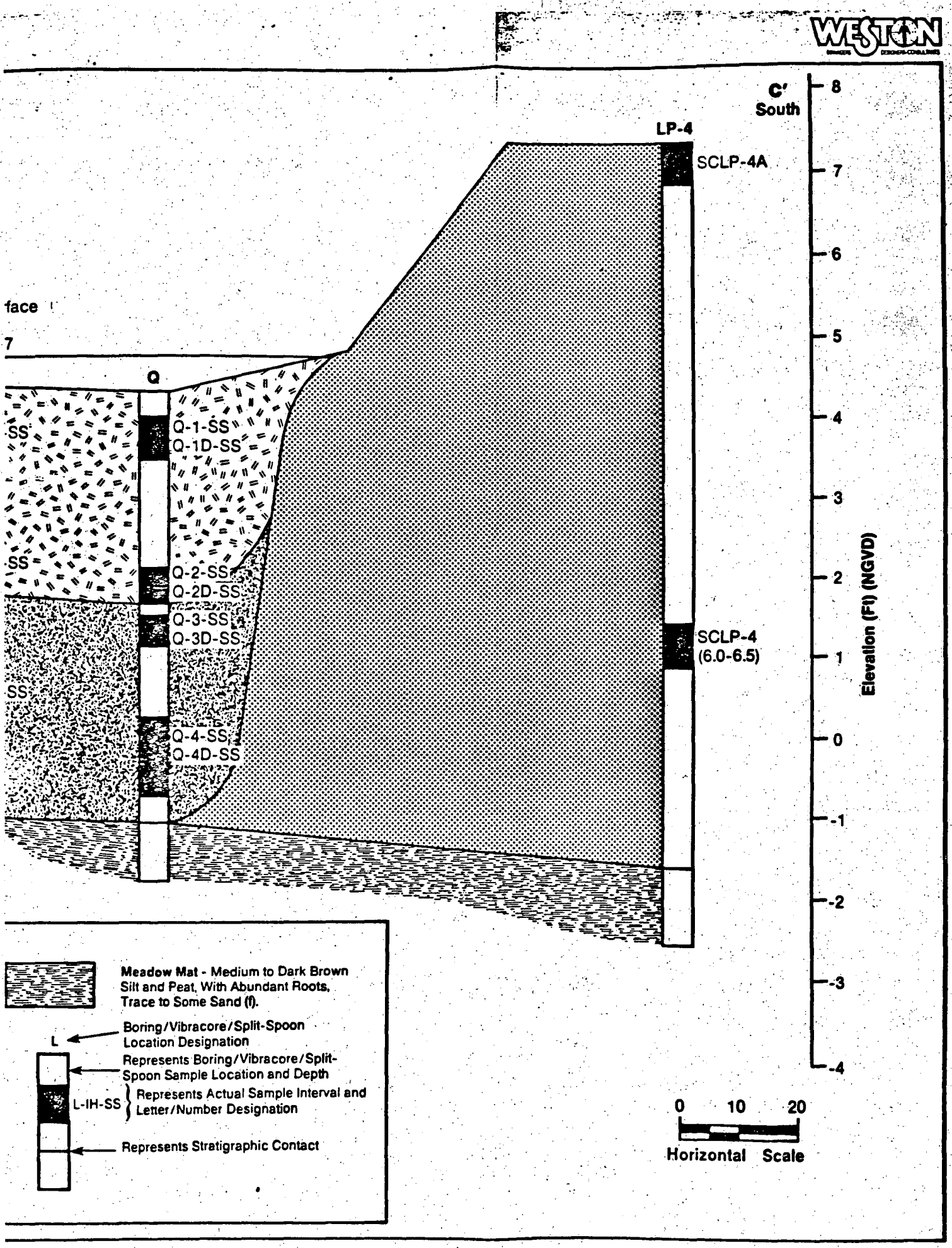


FIGURE 1-5 STRATIGRAPHIC CROSS-SECTION C-C'

TABLE 2-1

STAGE II AND III ANALYSIS SUMMARY

WESTON Sample Number	Enseco Cal. Lab I.D. Number	2,3,7,8-TCDD Measured (ppb)	2,3,7,8-TCDD Detection Limit (ppb)
Method Blank	040484-MB	ND	0.016
Method Blank	040484-MBRX	ND	1.6
MBNS	040484-MBN	0.85	--
MBNS	040484-MBN	0.83	--
R-3-SS	040494-007	190	--
R-4-SS	040484-008	46	--
R-4-SS Dup	040484-008D	43	--
E-3-SS	040484-010	2.9	--
E-3-SS NJ	040484-010NS	10.3	--
E-4-SS	040484-011	1.2	--
F-1	040484-020	2.3	--
O-2-SS	040484-029	ND	0.35
K-4-SS	040484-062	3.7	--
J-3-SS	040484-064	268	--
J-3-SS	040484-64D	237	--
J-3-SS NJ	040484-064 NJ	273	--
J-4-SS	040484-080	148	--
K-3-SS	040484-081	6.1	--
J-2-SS	040484-082	*	*
STDCL-4B	040484-083	6.8	--
STDCL-3A	040484-085	9.9	--

* Results of this sample analysis not reported due to crysallization of liquid phase following extraction. See text and Enseco Laboratory Report.

Results of the Stage II and III analyses showed the presence of 2,3,7,8-TCDD above the action concentration of 1 ppb in all of the samples tested (with the exception of 0-2-SS). Concentrations ranged from 1.2 ppb (E-4-SS) to 268 ppb (J-3-SS). Sample J-2-SS could not be analyzed, as repeated attempts at cleanup using a number of techniques cold not prevent the occurrence of a crystalline precipitate after extraction.

2.3 FINDINGS AND RECOMMENDATIONS

2.3.1 Findings

1. Results of Stage I, II, and III analyses of samples collected from the lagoons have shown that 2,3,7,8-TCDD is present at variable concentrations throughout the vertical extent of the waste and across most of the horizontal extent of the lagoons.

2. Waste in the lagoons consist of two primary types. These are a 1-3 foot thickness of white to brown bladed crystals mixed with silt, underlain by a 2-4 foot thickness of predominantly black tar, soft to hard, containing variable proportions of brick and wood debris. The average thickness of the two combined wastes is approximately 5 feet.

3. Lagoon wastes are directly underlain by native material referred to as "meadow mat", with abundant roots. Based upon area reports, the meadow mat is in turn underlain by a 3-6 foot layer of sand, at a depth of approximately 15-20 feet below ground surface, which overlies approximately 8-10 feet of clayey material. Glacial till and bedrock of the Brunswick Formation are believed to underlie the clayey unit.

4. The lagoons were constructed by excavation through a fill material consisting of a granular chromium slag. This slag material is widespread in the Hackensack River floodplain area, having been used in the past to raise the elevation of former wetlands for future development purposes.

5. Based upon area reports, shallow ground water exists in the area within the chromium slag material under water-table conditions, and in the

sand unit (beneath the meadow mat) under semi-confined conditions. These ground waters are non-potable as a result of both their brackish character and their being impacted by historical cultural activities in the area.

2.3.2 Recommendations

It is clear, based upon the findings listed above, that a number of waste materials are present in the lagoons. However, any action taken regarding remediation or closure of the lagoons will be driven by the presence of 2,3,7,8-TCDD, in spite of the known existence of contamination resulting from the deposition of chromium slag and other activities. Therefore, additional resources should be directed toward determining the extent of 2,3,7,8-TCDD contamination to guide the evaluation and selection of feasible remedial alternatives.

There are presently no approved permanent on-site or off-site remedial technologies for 2,3,7,8-TCDD waste materials. As a result, 2,3,7,8-TCDD wastes are being handled nation-wide by means of engineered containment/storage until an approved technology is available. In order to evaluate various interim containment/storage options, WESTON recommends the following:

1. The potential for migration of 2,3,7,8-TCDD into underlying hydrogeologic units should be examined by construction and sampling of four pairs of monitor wells around the lagoons. These wells should be constructed such that each pair would monitor the most shallow water-bearing unit (fill material-chromium slag located above the meadow mat), as well as the next deepest hydrogeologic unit (a fine to coarse sand to a depth of approximately 15-20 feet below ground surface, immediately below the meadow mat).

2. A Work Plan should be prepared to describe in detail the locations, construction materials and procedures, well development and all other information relating to the proposed wells.

3. The new wells should be sampled and analyzed for the presence of 2,3,7,8-TCDD.

4. The wells should be constructed and sampled, and ground water analyzed in accordance with all applicable NJDEP guidelines and regulations.